AD-A110 162 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MAIN MILL DAM (INVENTORY NUMBER N.--ETC(U)
SEP 81 G KOCH DACW51-79-C-0001

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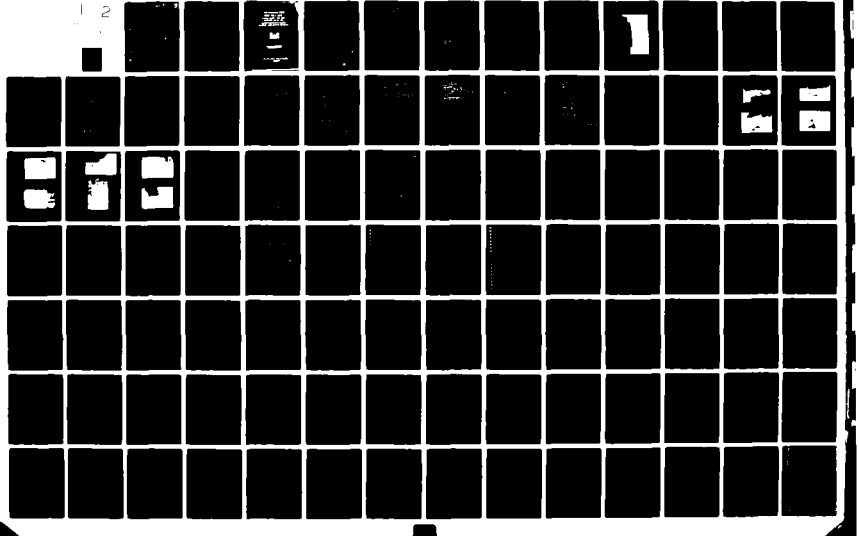

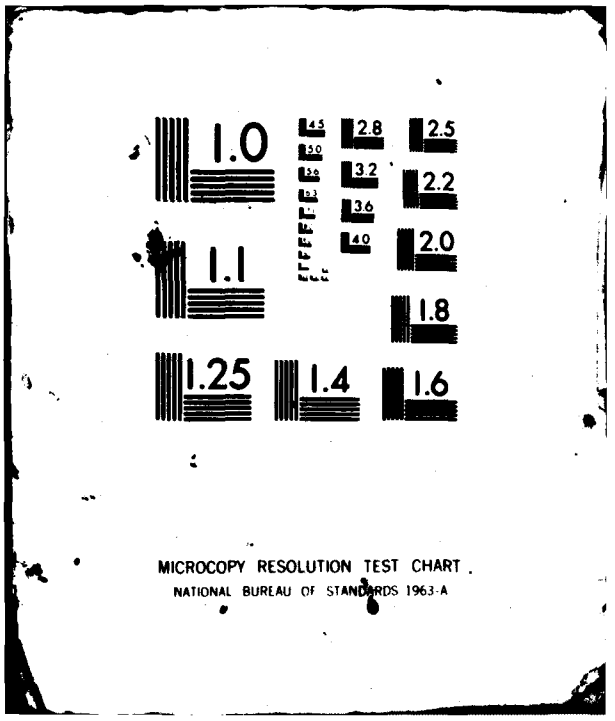
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REPORT DOCUMENTATION PAGE

LEVEL II

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A110 162	

4. TITLE (and Subtitle)	5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report Main Mill Dam Lower Champlain Basin, Clinton County, NY Inventory No. NY00262	Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) GEORGE KOCH	8. CONTRACT OR GRANT NUMBER(s) DACW51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 114
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Visual Inspection
Hydrology, Structural Stability
Main Mill Dam
Clinton County, NY
Lower Champlain Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Visual inspection of this dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further engineering investigations and remedial work. → next page

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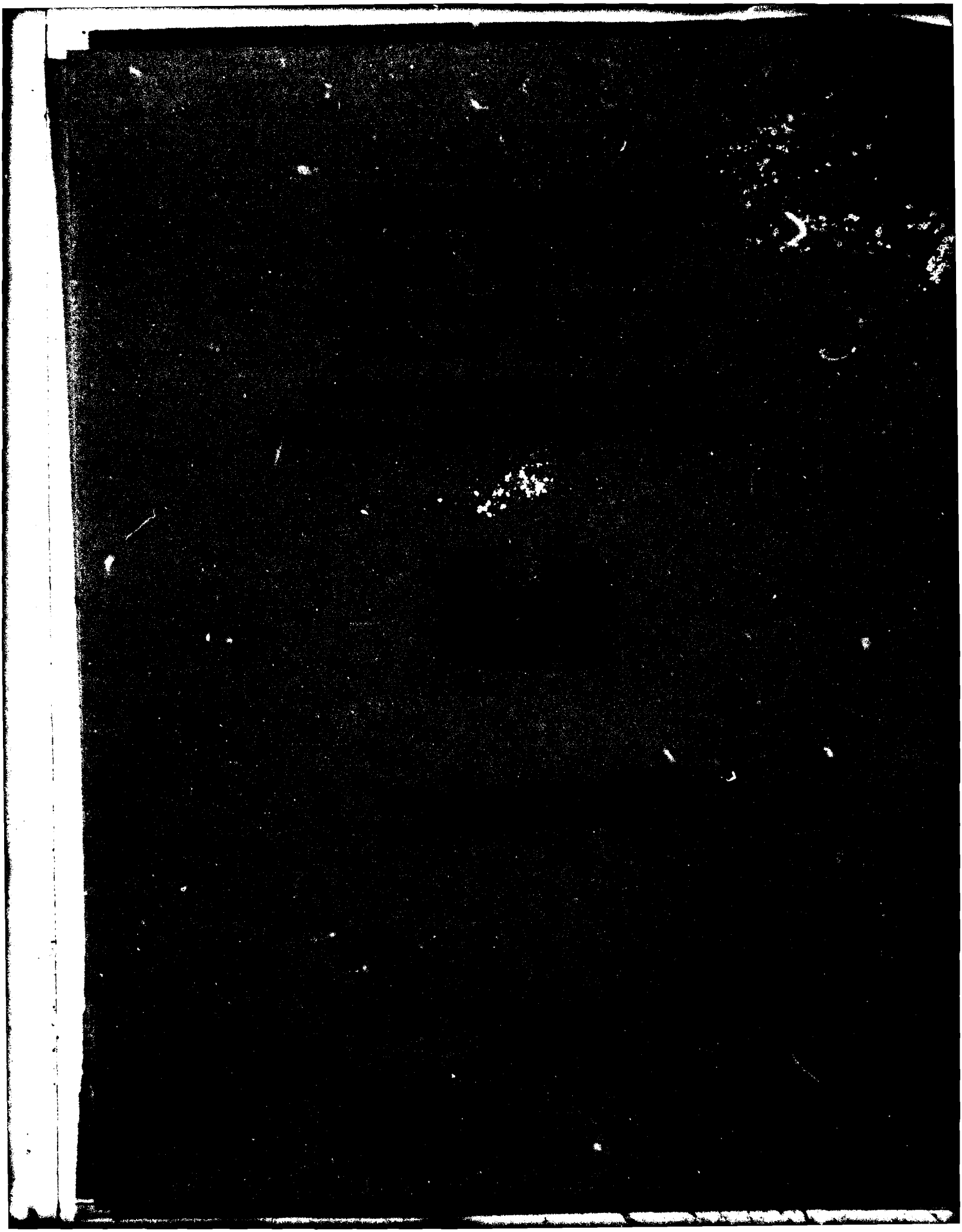
Structural stability analyses performed for this report indicate that the spillway section is unstable for all conditions studied. The analysis was based on the limited information available and so may not reflect existing conditions. However, the analysis does indicate that there is a serious question concerning the stability of this dam and further investigations are required.

It is recommended that within 3 months of the date of notification of the owner, investigations into the structural stability deficiencies should be commenced. These studies should include developing accurate cross sections of the dam, progressing subsurface explorations, and coring the dam. This information should then be incorporated into a detailed stability evaluation and the need for modifications to the structure should be determined. Required changes of the structure should be completed within 18 months.

The spillway, while only having sufficient capacity to discharge 20% of the Probable Maximum Flood (PMF) is considered to be inadequate. For such a large storm event, a high tailwater condition would occur, resulting in the flooding of downstream hazard area. Hence, dam failure during a large storm event would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure.



PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MAIN MILL DAM
I.D. NO. NY-262
DEC #236A-234
LAKE CHAMPLAIN BASIN
CLINTON COUNTY, NEW YORK

TABLE OF CONTENTS

APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Main Mill Dam (I.D. No. NY-262)
State Located:	New York
County:	Clinton
Watershed:	Lake Champlain Basin
Stream:	Saranac River
Date of Inspection:	June 16, 1981

ASSESSMENT

Visual inspection of this dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further engineering investigations and remedial work.

Structural stability analyses performed for this report indicate that the spillway section is unstable for all conditions studied. The analysis was based on the limited information available and so may not reflect existing conditions. However, the analysis does indicate that there is a serious question concerning the stability of this dam and further investigations are required.

It is recommended that within 3 months of the date of notification of the owner, investigations into the structural stability deficiencies should be commenced. These studies should include developing accurate cross sections of the dam, progressing subsurface explorations, and coring the dam. This information should then be incorporated into a detailed stability evaluation and the need for modifications to the structure should be determined. Required changes of the structure should be completed within 18 months.

The spillway, while only having sufficient capacity to discharge 20% of the Probable Maximum Flood (PMF) is considered to be inadequate. For such a large storm event, a high tailwater condition would occur, resulting in the flooding of downstream hazard area. Hence, dam failure during a large storm event would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure.

Other deficiencies noted should be corrected within 12 months of the date of notification of the owner. Among the required actions are the following:

1. Cut trees and brush growing on the non-overflow embankment section at the left end of the dam.

2. Investigate the area where the sanitary sewer line goes through the embankment to assure that the backfill material is sufficiently impervious.

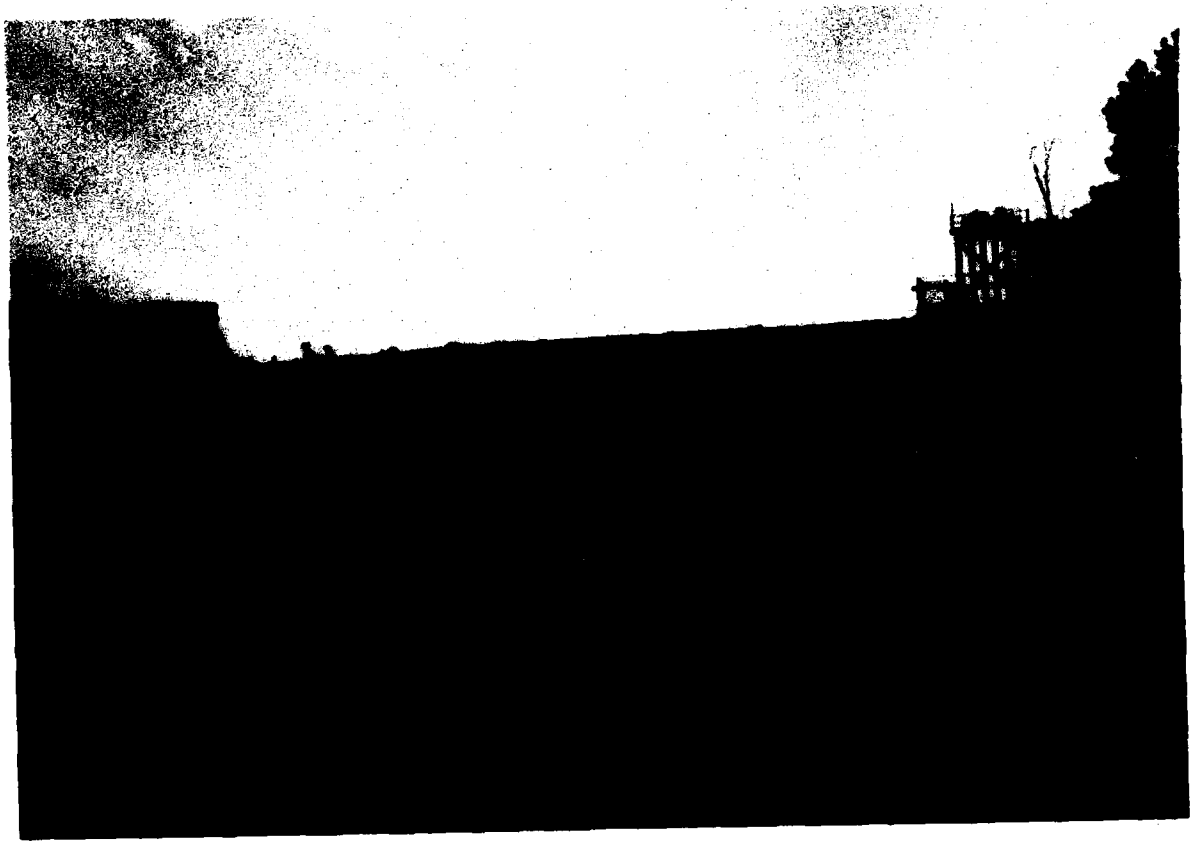
3. Develop an emergency action plan for the notification and evacuation of downstream residents.

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

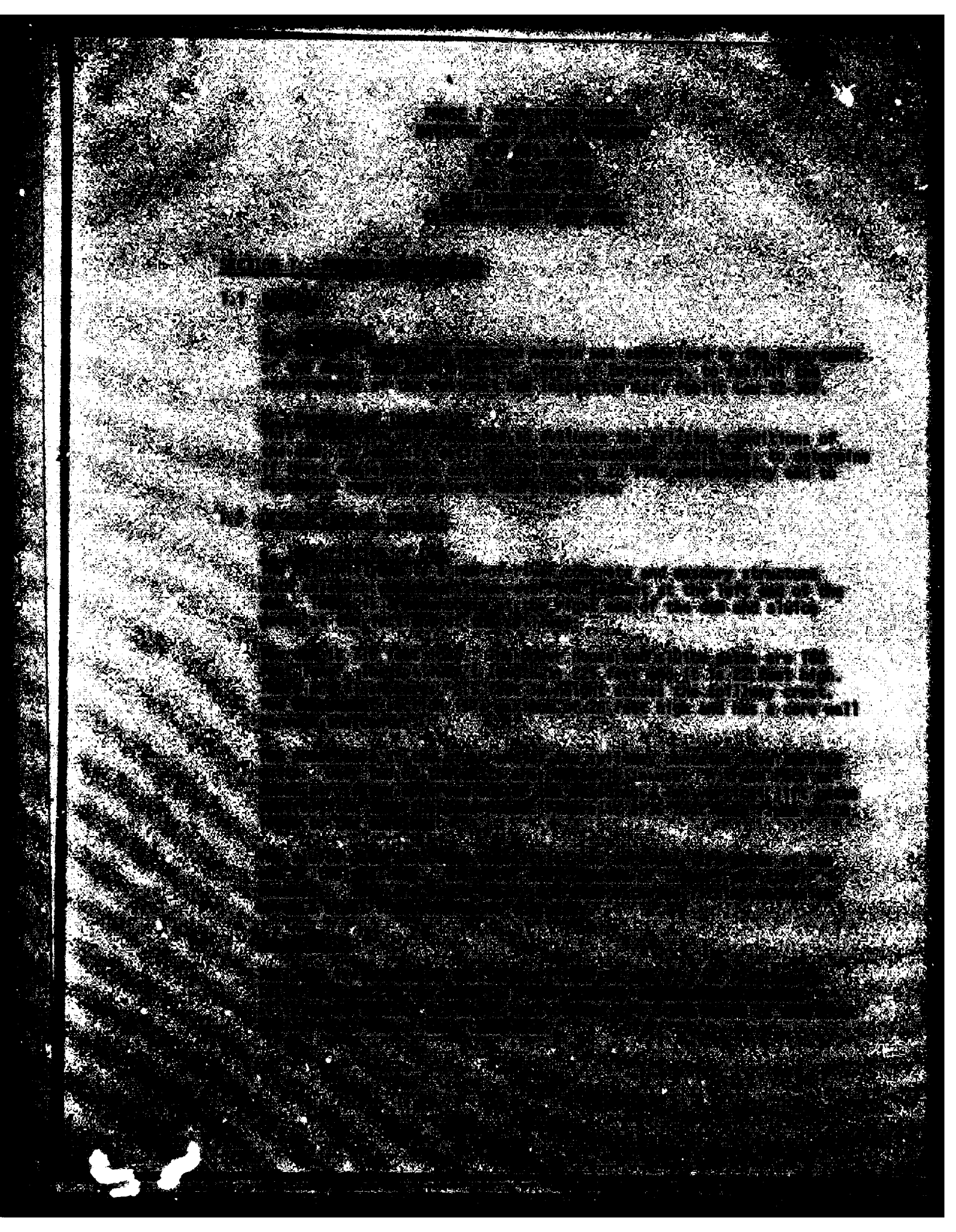
Approved By:

Col. W.M. Smith Jr.
New York District Engineer

Date: 23 Sept 81



OVERVIEW
MAIN MILL DAM
I.D. NO. NY262



c. Size Classification

This dam is 26 feet high and has a storage capacity of 1413 acre-feet. Therefore, the dam is in the intermediate size category as defined by the "Recommended Guidelines for Safety Inspection of Dams."

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of a trailer park and substantial development, including the City of Plattsburgh, downstream of the dam.

e. Ownership

This dam is owned by the Imperial Paper Company. The company's address is Underwood Avenue, Plattsburgh, New York 12901. Mr. George La Tulippe is the Chief Engineer for the plant. His assistant is Mr. Roy McGee. Their phone number is (518) 563-3800.

f. Purpose of Dam

This dam impounds a reservoir used for the generation of electrical power. The electricity generated is used by the owner.

g. Design and Construction History

There was no information available concerning the original design or construction of this dam. An old inspection report indicated that the dam was built in 1909 by John J. Cunningham.

h. Normal Operating Procedures

There are no prescribed operating procedures for this structure. The flashboards on the spillway section remain in place year round.

1.3 PERTINENT DATA

a. Drainage Area — 608 square miles

b. Discharge at Dam	Water Surface Elev.	(cfs)
Spillway:	193.8	15,820
	190.3	6,420
	188.5	2,846
Flood Gate (fully open):	193.8	2,146
	186.0	1,415
Powerhouse:	-	-

c. Elevation	(USGS Datum)
Top-of-Dam (@ Left embankment)	193.8
Top-of-Closed Flood Gate	190.3
Top-of-Flashboards	188.5
Spillway Crest	186.0
Flood Gate-sill	174.0

d. Reservoir-Surface Area	(acres)
Spillway Crest	83.6

e. Storage Capacity	(acre-feet)
Top-of-Dam	1413
Top-of-Flashboards	970
Spillway Crest	761
Flood Gate-Sill	310

f. Dam

Type - Concrete and masonry spillway gravity section; embankment section with core wall at left end of dam

Dam Length (ft) 715

g. Spillway

Type - Concrete and masonry overflow weir with 2.5 feet of flashboards across entire crest

Length (ft) 225

h. Sluice Gates

Type- Two timber and steel channel gates controlled by electric mechanism located above gates

Size of Gates (approximate) 5' x 12'

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

The Main Mill Dam is located in the Champlain lowlands physiographic province of New York State. The Champlain Lake Plain is a low, relatively flat area underlain with marine clays and limestone. Drift deposits and peat bogs are common in the northeast portion of the plain. Bedrock in the area is from the Ordovician era (435 to 500 million years ago). A review of the Brittle Structures Map of New York indicates that there is a topographic linear feature in the vicinity of the dam.

Surficial soils in the area are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

No records of any subsurface investigations performed in the vicinity of this structure could be located.

2.2 DESIGN RECORDS

No design records for this structure could be located.

2.3 CONSTRUCTION RECORDS

The only information available concerning the construction of this dam was included on a Conservation Commission inspection report, a copy of which has been included in Appendix F. This report states that the dam was constructed by John J. Cunningham. The report was prepared by Mr. Cunningham and included sketches of the dam.

2.4 OPERATIONS RECORDS

There were no operations records available for this structure.

2.5 EVALUATION OF DATA

Data used for the preparation of this report was obtained from the Department of Environmental Conservation files. The information available was very limited and analyses performed for this report had to be based on sketches from an old inspection report and on data and measurements gathered during the visual inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Main Mill Dam was conducted on June 16, 1981. The weather was sunny and the temperature was in the mid-eighties. The water surface at the time of this inspection was at the level of the top of the flashboards, with some water spilling over the crest.

b. Spillway

The spillway composes the major portion of this dam. At the time of the inspection, water flowing over the flashboards made a detailed inspection of the downstream face impossible. No serious deficiencies were noted on the portions which were visible. Mr. McKee of the Imperial Paper Company reported that a gunite-type grouting was done on the spillway section in 1975. He stated that this work significantly reduced the leakage through the masonry.

c. Non-Overflow Segment

Inspection of the nonoverflow segment, at the left end of the dam, was hampered by trees and brush growing on the embankment. The vertical alignment of this section was slightly irregular but generally satisfactory. There was no indication of any sloughing or subsidence. No seepage or wet areas were observed. There was no slope protection on the upstream slope although there was a small area of concrete paving protecting the right end of the embankment (adjacent to the sluice gates).

An excavation had been made through the embankment to install a sanitary sewer line from the plant. There was a manhole in the center of this area. The backfill material near the surface was crushed stone. It was not known whether the remainder of the backfill was compacted properly to assure the imperviousness of the embankment.

d. Sluice Gates

The sluice gates at the left end of the spillway appeared to be in satisfactory condition. There were several leaks between the timbers and the steel channels which supported them. There was also some leakage under the gates. The control mechanism, located above the gates, was in satisfactory condition. The gates were reported to be operational and are opened several times each year.

e. Powerhouse

Minor concrete deterioration was noted on several of the exterior surfaces of the powerhouse. The trashracks and two vertical slide gates on the upstream end appeared to be in satisfactory condition. There was minor wetness on the interior walls of the powerhouse but the overall condition was satisfactory.

f. Downstream Channel

The downstream channel below this dam is the normal river bed, having exposed bedrock and numerous boulders scattered along the bottom.

3.2 EVALUATION OF OBSERVATIONS

Visual observations revealed several deficiencies on this structure. The following items were noted:

1. Trees and brush growing on the non-overflow embankment section at the left end of the dam.

2. Crushed stone backfill material in the area where the sanitary sewer line had been placed through the embankment.

3. Minor leakage on the sluice gates between the timers and the steel channels supporting them as well as under the gates.

4. Minor concrete deterioration on the exterior surfaces of the power house.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

There are no prescribed operating procedures for this dam. Flashboards remain in place on the spillway crest year round. The sluice gates are opened when the owner wants to drop the water level in the reservoir.

4.2 MAINTENANCE OF DAM

Normal maintenance is performed as required by the owner.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system for evacuation of downstream residents is present.

4.4 EVALUATION

The operation procedures for this dam are satisfactory. Some increased maintenance efforts are required to correct some of the deficiencies noted in Section 3.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The delineation of the contributing watershed to this dam is indicated on the map titled "Drainage Area Map - Main Mill Dam" (Appendix C.) The irregular but somewhat rectangular-shaped, northeast-southwest oriented watershed of some 608 square miles is comprised of relatively undeveloped lands consisting of forests, open fields, woodlands, and mountains. The slope along the Saranac River main stem is flat to moderate, with abrupt changes in elevation occurring at nine run-of-river dams located between this site and Saranac Lake. However, the hills and mountains throughout the watershed have steep slopes with those hills forming the watershed divide ranging in elevation from 2000 to 4600 feet above the reservoir.

Numerous bodies of water within the drainage basin lie primarily in the upper reaches of the watershed; these being Lake Clear, Lake Colby, the Upper Middle and Lower Saranac Lakes, Lake Kiwassa and Oseetah Lake (all within the Lake Flower subbasin) plus Rainbow Lake, Lake Kushaqua, Loon Lake, Franklin Falls Pond, Union Falls Pond and Silver Lake. The lower end of the watershed contains only Patterson Reservoir and Mead Reservoir as sizeable bodies of water.

The major tributaries to the Saranac River main stem are the North Branch of the Saranac River and Silver Lake Brook. Many smaller streams connect the numberous lakes and/or discharge directly to the main stem. There are no known flow diversions either into or out of this watershed.

5.2 ANALYSIS CRITERIA

No hydrologic/hydraulic information was available regarding the original design for this dam. Therefore, the analysis of the flood-water retarding capability of the dam was performed using the Corps of Engineer's HEC-1 computer program, Dam Safety version. The computer program develops inflow hydrograph using the "Snyder Unit Hydrograph" method and then reservoir and/or channel routs the hydrographs using the "Modified Puls" flood routing procedure.

The Probable Maximum Flood (PMF) reservoir routed, outflow hydrograph at the upper subbasin, controlled by the Lake Flower Dam, was input directly to the program.

The lagged hydrograph was then channel routed down the Saranac River to this site but the nine intervening run-of-river dams were not taken into account for floodwater attenuation. The resulting runoff hydrographs were then combined at this dam and flood-routed over the spillway.

The spillway design flood selected for analysis was the Probable Maximum Flood, in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers. The PMF event is that hypothetical storm event resulting from the most critical combination of rainfall, minimum soil retention, and direct runoff to a specific site that is considered reasonably possible for a particular watershed.

The Corps of Engineers' Upper Hudson and Mohawk River Basin study (ref.7) was used to obtain hydrograph parameters, rainfall loss rate values of 1.0 inches (initial) and 0.1 inches per hour (constant) and base flow parameters. Precipitation values used in the analysis were obtained from the Weather Bureau publication, HMR 33.

5.3 SPILLWAY CAPACITY

The single, ungated 225 foot long, concrete and masonry spillway was analyzed for weir flow using a discharge coefficient, C, of 3.2. Although there presently exists 2.5 feet of wooden flashboards on the crest, the floodwater analysis assumed no flashboards in place. There also exists a flood gate at the left end of the spillway. The gate, with a computed discharge capacity of 2146 cfs fully open for a water surface at the spillway crest, was assumed in the closed position for the floodwater analysis. Also, no additional discharge capacity through the hydropower machinery inside the mill at the right end of the dam was included. The computed discharge capacity of the spillway is 15,820 cfs.

The flood water analysis performed for this dam indicates that the spillway does not have sufficient capacity for discharging one half the PMF. For this storm event, the peak inflow is 38,764 cfs and the peak outflow is 38,697 cfs. The PMF peak inflow and peak outflow are 77,528 cfs and 77,421 cfs respectively.

5.4 RESERVOIR CAPACITY

The normal water surface is at or near the top-of-flashboards (elevation 188.5 -USGS). The impounded capacity at this elevation is 970 acre-feet. The storage volume between the spillway crest elevation and the top-of-flashboards is 209 acre-feet. The total surcharge storage capacity to the top-of-dam (elevation 193.8) is 652 acre-feet which is equivalent to a direct runoff depth of 0.02 inches over the entire watershed. The total storage capacity at top-of-dam is 1413 acre-feet.

5.5 FLOODS OF RECORD

The maximum known flood occurring on the Saranac River was recorded at the nearby USGS gaging station, located 600 feet downstream of this dam, on April 8, 1928. The recorded discharge was 11,500 cfs. For this flow discharging entirely over the spillway, the computed water surface is 6.3 feet above the spillway crest (elevation 192.3 USGS) just 1.5 feet below the top-of-dam.

5.6 OVERTOPPING POTENTIAL

Analyses using one-half the PMF storm event indicates that the spillway

does not have sufficient discharge capacity..The peak outflow from one-half PMF event will overtop the dam to a computed depth of 4.42 feet. The peak outflow from the PMF event will overtop the dam to a computed depth of 10.05 feet. All storm events exceeding 20% of the PMF will result in the dam being overtopped.

5.7 EVALUATION

The spillway does not have sufficient capacity for discharging the peak outflow from one half the PMF without the dam being overtopped. For such a large storm event, a high tailwater condition would most likely occur resulting in the flooding of the downstream hazard areas. Hence, the spillway capacity is not considered to be seriously inadequate since dam failure from overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure. Therefore, the spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The water flowing over the spillway made a detailed inspection of this segment of the dam impossible. However, no serious deficiencies were noted on the segments which were visible. Trees and brush growing on the non-overflow segment at the left end of the dam hampered the visual inspection of this area, but no serious defects were noted. The sluice gates at the left end of the spillway appeared to be in satisfactory condition with only minor leakage under the gates. Some minor concrete deterioration was noted on the power house at the right end of the dam.

b. Data Review and Stability Evaluation

No design or construction information concerning this structure was available. A Conservation Commission Inspection Report from 1913 contained a sketch of the dam's cross section. This sketch and measurements made at the time of the inspection were used to develop the approximate cross section shown in Appendix D. The stability analysis performed for this report was based on this approximate cross section. The results of the analysis are as follows:

Case	Overturning Safety Factor	Resultant in Middle Third	Sliding Safety Factor
a. Normal conditions, 2.5 feet of flashboards in place, surface at top of flashboards	0.94	No	0.65
b. Water surface at spillway crest (no flashboards) ice load of 5,000 lb/ft	0.81	No	0.65
c. Flood flow; water surface at top of dam, 7.8 ft. above spillway crest	0.76	No	0.47
d. Normal conditions as in case a. with seismic coefficient of 0.10.	0.88	No	0.51

This stability analysis indicates that the spillway section of the dam is unstable for all conditions studied. The fact that this structure has stood for eighty years indicates that the actual safety factors are substantially higher than those computed.

The analysis performed was based on the available information which may not accurately reflect the existing conditions. However, this analysis does indicate that there is a serious question concerning the stability of this dam and that further investigations are required.

The additional investigations should include developing accurate cross sections of the dam. Subsurface explorations and cores of the dam should be taken to obtain information about the structure and uplift forces acting on the foundation. A revised stability analysis should then be performed using this data. Based on the results of these analyses, the need for modifications to the structure should be determined.

c. Seismic Stability

This structure is located in Seismic Zone 3. A seismic stability analysis was performed for the dam assuming a seismic coefficient of 0.1. The results of this analysis (shown on page 11) indicate that the safety factors are below 1.0 for both overturning and sliding. Therefore, when the revised stability analysis is performed, seismic stability criteria should also be met.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Main Mill Dam revealed several deficiencies which can affect the safety of the dam. The most serious of these deficiencies are related to the stability of the spillway segment of the dam.

The stability analysis performed for this report indicates that the spillway section is unstable for all conditions studied. This analysis was based on the limited information available and so may not reflect existing conditions. However, the analysis does indicate that there is a serious question concerning the stability of this dam and further investigations are required.

The spillway, while not having sufficient discharge capacity for passing one-half of the Probable Maximum Flood, is considered to be inadequate. For such a large storm event, a high tailwater condition would occur, resulting in the flooding of downstream hazard areas. Hence, dam failure during a large storm event would not significantly increase the hazard to loss of life downstream from that which would exist just before overtopping failure.

b. Adequacy of Information

The information available, while sufficient for the preparation of the Phase I report, was deficient in several respects. No plans or design information could be located. Analyses performed for this report were based on sketches from a 1912 Conservation Commission inspection report and measurements made at the time of the inspection.

c. Need for Additional Investigation

Further analysis of the structural stability of the spillway section is required. These studies should include developing accurate cross sections of the dam, progressing subsurface explorations, and coring the dam. This information should then be incorporated into a detailed stability evaluation.

d. Urgency

The investigations of the structural stability should be commenced within 3 months of the date of notification of the owner. Remedial measures deemed necessary as a result of this investigation should be completed within 18 months. Other deficiencies noted should be corrected within 12 months of the date of notification.

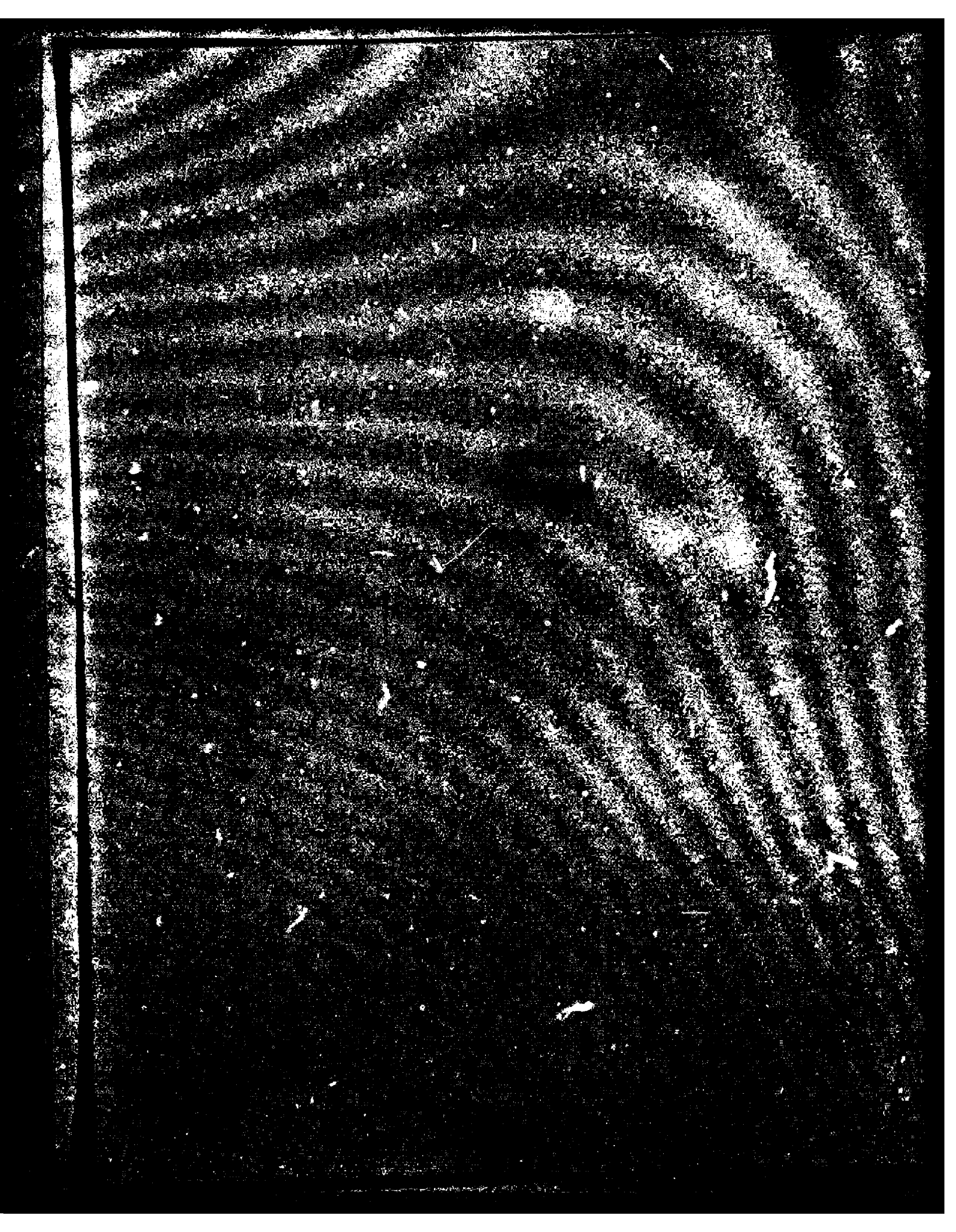
7.2 RECOMMENDED MEASURES

1. Modify the structure as necessary, based on the stability analysis.

2. Cut trees and brush growing on the non-overflow embankment section at the left end of dam.

3. Investigate area where the sanitary sewer line goes through the embankment to assure that the backfill material is sufficiently impervious.

4. Develop an emergency action plan for the notification and evacuation of downstream residents.

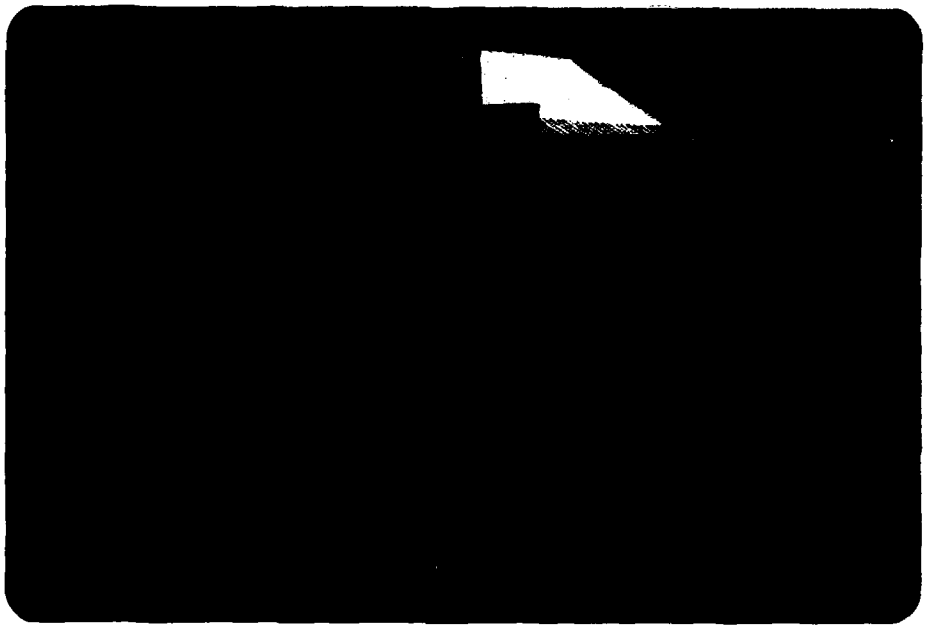


1913 PHOTO OF DOWNSTREAM FACE OF STRUCTURE

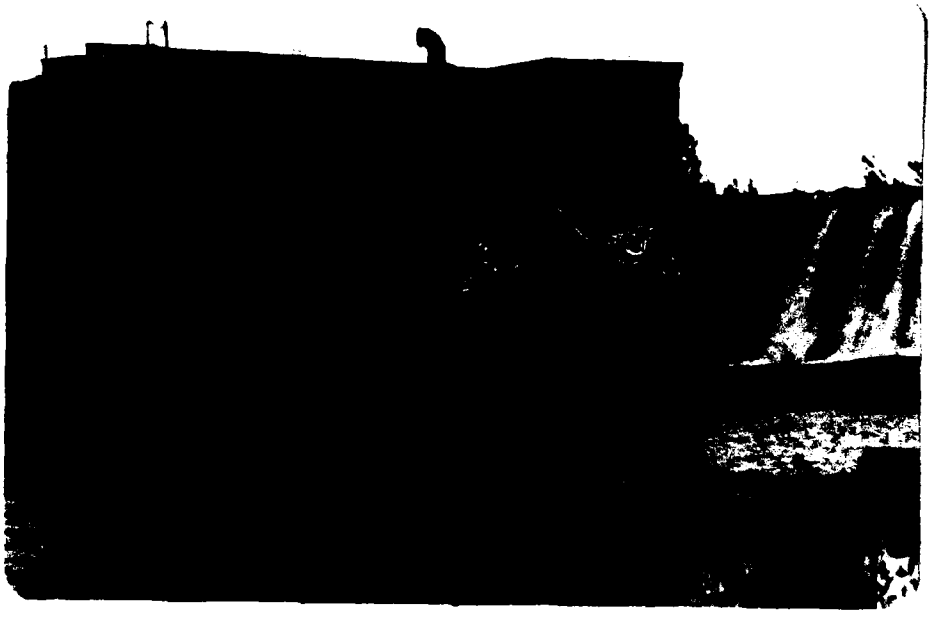
CURRENT PHOTO OF DOWNSTREAM FACE OF STRUCTURE

DOWNSTREAM FACE OF SPILLWAY SECTION

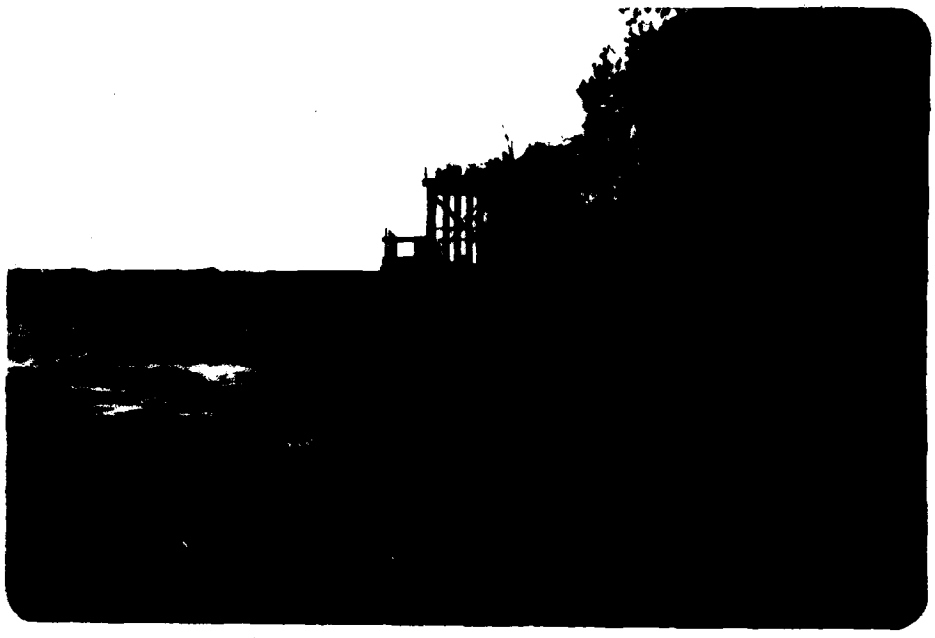
DOWNSTREAM FACE OF SPILLWAY SECTION



UPSTREAM VIEW OF POWERHOUSE



DOWNSTREAM VIEW OF POWER HOUSE



SLUICE GATE STRUCTURE AT END OF SPILLEAY SECTION

SLUICE GATES, NOTE MINOR LEAKAGE
AT EDGES OF GATES

NON-OVERFLOW EMBANKMENT SECTION
AT LEFT END OF SPILLWAY

NON-OVERFLOW EMBANKMENT SECTION LOOKING BACK AT SPILLWAY
CRUSHED STONE IN FOREGROUND IS FROM THE
EXCAVATION FOR THE SEWER LINE

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) **Basic Data**

a. General

Name of Dam MAIN MILL DAM

Fed. I.D. # 262 DEC Dam No. 236A-234

River Basin LAKE CHAMPLAIN

Location: Town PLATTSBURGH County CLINTON

Stream Name SARANAC RIVER

Tributary of —

Latitude (N) 44° 41′ Longitude (W) 73° 28.4′

Type of Dam CONCRETE & MASONRY

Hazard Category C

Date(s) of Inspection 6/16/81

Weather Conditions SUNNY 85°

Reservoir Level at Time of Inspection AT FLASHBOARD CREST

b. Inspection Personnel R.L. WARRENDER W.C. LYNICK

c. Persons Contacted (Including Address & Phone No.)

ROY McKEE - IMPERIAL PAPER COMPANY
UNDERWOOD AVE
PLATTSBURG, NEW YORK
518-563-3800

d. History:

Date Constructed 1909 Date(s) Reconstructed

Designer

Constructed By JOHN J. CUNNINGHAM

Owner IMPERIAL PAPER COMPANY

2) Embankment - LEFT END OF DAM

a. Characteristics

(1) Embankment Material - UNKNOWN -

(2) Cutoff Type CORE WALL EXTENDS INTO FOUNDATION

(3) Impervious Core CORE WALL - UNKNOWN COMPOSITION

(4) Internal Drainage System NONE

(5) Miscellaneous

b. Crest - 10 FT WIDE

(1) Vertical Alignment SLIGHTLY IRREGULAR

(2) Horizontal Alignment SATISFACTORY

(3) Surface Cracks NONE

(4) Miscellaneous MANHOLE CONTAINING PIPE FROM SANITARY SEWER FROM PLANT IS ON EMBANKMENT. - BACKFILL ON TOP IS CRUSHED STONE

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 on 2

(2) Undesirable Growth or Debris, Animal Burrows SOME BRUSH & TREES

(3) Sloughing, Subsidence or Depressions NONE

(4) Slope Protection NO REGULAR PROTECTION ACROSS SLOPE - THERE IS SOME CONCRETE ON SLOPE & CREST AT END OF EMBANKMENT ADJACENT TO SPILLWAY SECTION

(5) Surface Cracks or Movement at Toe UNOBSERVABLE

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 ON 2

(2) Undesirable Growth or Debris, Animal Burrows SUBSTANTIAL AMOUNT OF GROWTH - BRUSH & TREES

(3) Sloughing, Subsidence or Depressions NONE NOTED

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage NONE

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure SATISFACTORY

(8) Seepage Beyond Toe NONE

e. Abutments - Embankment Contact

CONCRETE PAVING PROTECTS SLOPE IN VICINITY OF END OF SPILLWAY

93-15-3(9/80)

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE

3) Drainage System

a. Description of System NONE

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

STAFF GAGE AT POWER HOUSE

USGS GAGE 600 FEET DOWNSTREAM OF DAM

93-15-3(9/80)

5) Reservoir

a. Slopes OKAY

b. Sedimentation NO APPARENT PROBLEMS

c. Unusual Conditions Which Affect Dam POND AREA IS FENCED OFF TO PREVENT ACCESS

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) CITY OF PLATTSBURG

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel ROCK & BOULDER CHANNEL

7) Spillway(s) (Including Discharge Conveyance Channel)

MAIN DAM - IS OVERFLOW SPILLWAY SECTION - SLUICE GATES AT LEFT END OF SPILLWAY CAN LOWER WATER LEVEL.

a. General

b. Condition of ~~Service~~ OVERFLOW Spillway - FLASHBOARDS ON CREST - 2.5 FT ABOVE CONCRETE CREST - FLASHBOARDS STAY IN PLACE YEAR ROUND

e. Condition of ~~Auxiliary Spillway~~ Sluice Gates - 2 GATES COMPOSED OF TIMBERS HELD IN PLACE IN STEEL CHANNELS - SOME LEAKAGE THROUGH SIDES OF GATES PLUS LEAKS ALONG SILL. CONTROL MECHANISM ELECTRICALLY OPERATED VIA MECHANISM ABOVE THE GATES

d. Condition of Discharge Conveyance Channel SARANAC RIVER CHANNEL.

8) Reservoir Drain/Outlet - SEE SLUICE GATES ABOVE

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

_____

Hydraulic Capability: _____

_____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

_____

9) Structural N/A

a. Concrete Surfaces

b. Structural Cracking

c. Movement - Horizontal & Vertical Alignment (Settlement)

d. Junctions with Abutments or Embankments

e. Drains - Foundation, Joint, Face

f. Water Passages, Conduits, Sluices

g. Seepage or Leakage

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates _____

l. Approach & Outlet Channels _____

m. Energy Dissipators (Plunge Pool, etc.) _____

n. Intake Structures _____

o. Stability _____

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition

POWER HOUSE - CONSISTS OF TRASH RACKS - 2 VERTICAL SLIDE GATES - A 35' DEEP FLUME - THEN THE POWER STATION. - CONTAINS FIVE TURBINE UNITS - TWO ARE PRESENTLY OPERABLE - THREE OTHERS USED TO BE USED TO OPERATE GRINDERS. THERE IS MINOR WETNESS ON THE INTERIOR WALLS OF THE POWER HOUSE - NO SERIOUS LEAKS. SOME CONCRETE DETERIORATION ON EKTERIOR WALLS BOTH UPSTREAM & DOWNSTREAM AS WELL.

11) Operation Procedures (Lake Level Regulation):

WATER SURFACE MAINTAINED AS HIGH AS POSSIBLE FOR POWER GENERATION

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

MAIN MILL DAM

NY 262

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	USGS DATUM Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	193.8	83.6+	1413
2) Design High Water (Max. Design Pool)			
3) ~~Auxiliary~~ Spillway Crest	186.0	83.6	761
4) Pool Level with Flashboards	188.5	83.6+	970
5) ~~Service Spillway~~ Crest FLOOD GATE SILL	174.0	83.6-	310

DISCHARGES

	Volume (cfs)
1) Average Daily	UNKNOWN
2) Spillway @ Maximum High Water	15,820
3) Spillway @ Design High Water	
4) Spillway @ ~~Auxiliary Spillway~~ FLASHBOARDS Crest Elevation	2,846
5) Low Level Outlet - FLOOD GATE FULLY OPENED	2,146
6) Total (of all facilities) @ Maximum High Water	15,820
7) Maximum Known Flood	
8) At Time of Inspection	11,500

CREST: **ELEVATION:** 193.8

Type: EARTH NON-OVERFLOW SEGMENT

Width: 15'± Length: 300'±

Spillover MASONRY SPILLWAY SECTION

Location CENTER OF DAM

SPILLWAY:

PRINCIPAL		EMERGENCY
186.0	Elevation	
CONCRETE & MASONRY OVERFLOW	Type	
2'±	Width	
	Type of Control	
✓	Uncontrolled	
	Controlled:	
2.5' FLASHBOARDS ACROSS CREST	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : USGS Gage #04273500

Location: 600 ft downstream of dam

Records:

Date - April 8, 1928

Max. Reading - 11,500 cfs

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

Sluice Gates (Electrically Operated) At End of Spillway

DRAINAGE AREA: 608 Sq. Mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: ADIRONDAK MOUNTAINS

Terrain - Relief: STEEP TO MODERATE

Surface - Soil: GLACIAL TILL

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation: _____

Reservoir:

Length @ Maximum Pool _____ (Miles)

Length of Shoreline (@ Spillway Crest) _____ (Miles)

DD-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	1/		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		WL	7/23/81

DRAINAGE AREA:

USGS GAGE # 04273500 @ DAM SITE : AREA = 608 SQ. MI.

SUBBASIN (LAKE FLOWER DAM) NY-707 AREA = 179 SQ. MI.

ΔA = 429 SQ. MI.

SUBBASIN - LOWER AREA = 429 SQ. MI.

MAIN STEM OF SARANAC RIVER (DAM TO LAKE FLOWER DAM):

QUAD SHT.	SCALE	INS.	FT.	
PLATTSBURG	1:24000	5.3		(RESV. L = 6400' (TO UPSTREAM DAM
MORRISONVILLE		24.4		
DANNEMORA		24.8		
MOFFITTSVILLE		3.5		
REDFORD		27.3		(24.4 TO CONFLUENCE (W/ SILVER LAKE BROOK
ALDER BROOK	1:24000	10.8		(9.4 TO OUTLET @ (UNION FALLS POND
		96.1	→ 192200	
			36.40 MILES	
LAKE PLACID	1:62500	7.5		
SARANAC LAKE	1:62500	11.0		
		18.5	→ 92354	
			18.25 MILES	
			L = 54.65 MILES	
			L_{CA} = 33.75 MILES	

```
(0001)   A1       LAKE FLOWER
(0002)   A2       HEC-1DB (SNYDER PARAMETERS)
(0003)   A3       PMF - DAM OVERTOPPING ANALYSIS
(0004)   B    300       0       20        C        C        C        C        C        4
(0005)   B1     5
(0006)   J      1        7        1
(0007)   J1   0.2      0.3      0.4      0.5      0.6      0.8      1.0
(0008)   K      0      100        C        C        C        0        1
(0009)   K1       RUNOFF SUBAREA 1
(0010)   M      1        1     32.9        0    179.1        0        C        C        1
(0011)   P      0      16.       77       91      102      108
(0012)   T      0        0        0        0        0        0      1.0      0.1        0     .136
(0013)   W    6.2    0.625
(0014)   X   -2.0    -0.10      1.6
(0015)   K      1      200        0        0        0        0        1
(0016)   K1       ROUTE THRU UPPER SARANAC
         Y      0        0        0        0        1
(0018)   Y1     0        3        1
(0019)   K      0      201        0        0        C        0        1
(0020)   K1       RUNOFF SUBAREA 2
(0021)   M      1        1     41.5        0    179.1        0        C        C        1
(0022)   P      0      16.       77       91      102      108
(0023)   T      0        0        0        0        0        0      1.0      0.1        0     .254
(0024)   W    5.0    0.625
(0025)   X   -2.0    -0.10      1.6
(0026)   K      2      200        0        0        0        0        1
(0027)   K1       COMBINE 2 HYDROGRAPHS AT UPPER SARANAC LAKE  1+2=2
(0028)   K      1      200        0        0        C        0        1
(0029)   K1       ROUTE OVER UPPER SARANAC LAKE DAM
(0030)   Y      C        C        C        1        1
(0031)   Y1     1        C        C        C        C        0    -1573        C
(0032)   SS     0    26000    55000   105000   163000
(0033)   SE  1573     1577     1580     1585     1590
(0034)   SS  1573      175     2.65      1.5
(0035)   SD  1575     2.65      1.5       10
(0036)   K      1      301        C        0        C        -        1
(0037)   K1       ROUTE THRU PIDDLE SARANAC LAKE
(0038)   Y      -        C        -        C        1
```

```
(0039)   Y1      3       3       1
(0040)   K       0     300               0       0       0       1
(0041)   K1        RUNOFF SUBAREA 3
(0042)   M       1       1    24.0       0   179.1       0       0       0       1
(0043)   P       3     16.      77      91     102     108
(0044)   T       0       0       0       0       0       0     1.0     0.1       0    .106
(0045)   W     4.3   0.625
(0046)   X    -2.3   -0.10     1.6
(0047)   K       2     300       0       0       0       0       1
(0048)   K1        COMBINE 2 HYDROGRAPHS  3+2=3
(0049)   K       1     300       0       0       0       0       1
(0050)   K1        ROUTE OVER OUTLET CONTROL AT MIDDLE SARANAC
(0051)   V       3       0       0       1       1
(0052)   Y1      1       0       0       0       0       0   -1536       0
(0053)   SS      0    6000   15000   29000
(0054)   SE   1536    1540    1545    1550
(0055)   SS   1536      35    2.65     1.5
(0056)   SO   1540    2.65     1.5       6
(0057)   K       1     400       0       0       0       0       1
(0058)   K1        ROUTE THRU SARANAC LAKE (LOWER)
(0059)   V       0       0       0       0       1
(0060)   Y1      0       3       1
(0061)   K       0     402       0       0       0       0       1
(0062)   K1        RUNOFF SUBAREA 4
(0063)   M       1       1    23.7       0   179.1       0       0       0       1
(0064)   P       0     16.      77      91     102     108
(0065)   T       0       0       0       0       0       0     1.0     0.1       0    .143
(0066)   W     3.2   0.625
(0067)   X    -2.0   -0.10     1.6
(0068)   K       0     500       0       0       0       0       1
(0069)   K1        RUNOFF SUBAREA 5
(0070)   M       1       1    19.2       0   179.1       0       0       0       1
(0071)   P       0     16.      77      91     102     108
(0072)   T       0       0       0       0       0       0     1.0     0.1       0    .01
(0073)   W     5.4   0.625
(0074)   X    -2.0   -0.10     1.6
(0075)   K       3     400       0       0       0       0       1
(0076)   K1        COMBINE 3 HYDROGRAPHS - INFLOW TO LOWER SARANAC  3+4+5=4
```

```
(0077)   K      1     400       0       0       0       0       1
(0078)   K1       ROUTE OVERDAM AT OUTLET TO LOWER SARANAC
(0079)   Y      0       0       0       1       1
(0080)   Y1     1       0       0       0       0       0   -1533       0
(0081)   SS     0    1500    3000    5100
(0082)   SE  1533    1540    1545    1550
(0083)   SS  1533      60     3.5     1.5
(0084)   SD  1537    2.65     1.5      12
(0085)   K      1     600       0       0       0       0       1
(0086)   K1       ROUTE THRU OSEETAH & LAKE FLOWER
(0087)   Y      1       0       0       0       1
(0088)   Y1     0       3       2
(0089)   K      0     601       0       0       0       0       1
(0090)   K1       RUNOFF SUBAREA 6
(0091)   M      1       1    37.8       0   179.1       0       0       0       1
(0092)   P      0    16.      77      91     102     108
(0093)   T      0       0       0       0       0       0     1.0     0.1       0    .067
(0094)   S    4.8   0.625
(0095)   X   -2.0   -0.10     1.6
(0096)   K      2     600       0       0       0       0       1
(0097)   K1       COMBINE 2 HYDROGRAPHS - INFLOW HYDROGRAPH FOR LAKE FLOWER  6+4=6
(0098)   K      1     600       0       0       0       0       1
(0099)   K1       ROUTE OVER LAKE FLOWER DAM
(0100)   Y      0       0       0       1       1
(0101)   Y1     1       0       0       0       0       0   -1528      -1
(0102)   Y4  1528    1529    1530    1531    1532    1534    1536    1538    1540    1542
(0103)   Y4  1544    1546    1548    1550
(0104)   Y5     0     140     500    1010    1625    3065    4775    6725    8880   11225
(0105)   Y5 13755   16440   19290   22285
(0106)   SS     0     820    2800    6200    9160   18460   30560   47000
(0107)   SE  1513    1522    1525    1528    1530    1535    1540    1545
(0108)   SS  1528
(0109)   SD  1533    2.65     1.5      32
(0110)   K     99
(0111)   A
(0112)   A
(0113)   A
(0114)   A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	100
ROUTE HYDROGRAPH TO	200
RUNOFF HYDROGRAPH AT	201
COMBINE 2 HYDROGRAPHS AT	200
ROUTE HYDROGRAPH TO	210
ROUTE HYDROGRAPH TO	301
RUNOFF HYDROGRAPH AT	300
COMBINE 2 HYDROGRAPHS AT	300
ROUTE HYDROGRAPH TO	300
ROUTE HYDROGRAPH TO	400
RUNOFF HYDROGRAPH AT	402
RUNOFF HYDROGRAPH AT	500
COMBINE 3 HYDROGRAPHS AT	400
ROUTE HYDROGRAPH TO	400
ROUTE HYDROGRAPH TO	600
RUNOFF HYDROGRAPH AT	601
COMBINE 2 HYDROGRAPHS AT	600
ROUTE HYDROGRAPH TO	600

END OF NETWORK

```
**********                                                    **********
FLOOD HYDROGRAPH PACKAGE (HEC-1)                              NEW YORK STATE
DAM SAFETY VERSION      JULY 1978                             DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                                FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL APR 79
**********                                                    **********
    1          A1  NY-787    LAKE FLOWER DAM                              LAKE CHAMPLAIN BASIN
    2          A2            DEC 183-1107 CHAMPLAIN                       FRANKLIN COUNTY
    3          A3            PMF -- 1/2 PMF     PHASE 1 - DALE            SNYDER UH
    4          B    180       3       0       0       0       0       0       0       0       0
    5          B1     5
    6          J      1       2       1
    7          J1   0.5       1
    8          K      0     100                                                    1
    9          K1             RUNOFF SUBAREA 1
   10          M      1       1    32.5            179.1                                   1
   11          P              16      77      91      102     108
   12          T                                                      1.0     0.1             0.136
   13          W    6.2   0.625
   14          X   -2.0   -0.10     1.6
   15          K      1     200                                                    1
   16          K1             ROUT THRU UPPER SARANAC
   17          Y                                      0       1
   18          Y1     0
   19          K      0     201                                                    1
   20          K1             RUNOFF SUBAREA 2
   21          M      1       1    41.5            179.1                                   1
   22          P              16      77      91      102     108
   23          T                                                      1.0     0.1             0.254
   24          W    5.0   0.625
   25          X   -2.0   -0.10     1.6
   26          K      2     200                                                    1
   27          K1             COMBINE 2 HYDROGRAPHS AT UPPER SARANAC LAKE  1+2=2
   28          K      1     200                                                    1
   29          K1             ROUT OVER UPPER SARANAC LAKE DAM
```

```
31   V1    1                                                    -1573    0
32   SS    0   26000   55000  185000  163000
33   SE 1573    1577    1580    1585    1590
34   SS 1573     175    2.65     1.5
35   SD 1575    2.65     1.5      10
36   K     1     301                                                 1
37   K1          ROUT THRU MIDDLE SARANAC LAKE
38   Y                                    0       1
39   Y1    0
40   K     0     300                                                 1
41   K1          RUNOFF SUBAREA 3
42   M     1       1    24.0          179.1                                1
43   P           16      77      91     182     188
44   T                                                      1.0     0.1          0.106
45   W   4.3   0.625
46   X  -2.0   -0.10     1.6
47   K     2     300                                                 1
48   K1          COMBINE 2 HYDROGRAPHS   3+2=3
49   K     1     300                                                 1
50   K1          ROUT OVER OUTLET CONTROL AT MIDDLE SARANAC
51   Y                                    1       1
52   Y1    1                                                    -1536    0
53   SS    0    6000   15000   29000
54   SE 1536    1540    1545    1550
55   SS 1536      35    2.65     1.5
56   SD 1540    2.65     1.5       6
57   K     1     400                                                 1
58   K1          ROUT THRU LOWER SARANAC LAKE
59   Y                                    0       1
60   Y1    0
```

```
61        K     0     462                                                    1
62        K1          RUNOFF SUBAREA 4
63        M     1      1    23.7          179.1                                    1
64        P           16     77     91     182     188
65        T                                                          1.0     0.1          0.143
66        W   3.2   0.625
67        X  -2.0   -0.10   1.6
68        K     0     580                                                    1
69        K1          RUNOFF SUBAREA 5
70        M     1      1    19.2          179.1                                    1
71        P           16     77     91     182     188
72        T                                                          1.0     0.1          0.01
73        W   5.4   0.625
74        X  -2.0   -0.10   1.6
75        K     3     460                                                    1
76        K1          COMBINE 3 HYDROGRAPHS - INFLOW TO LOWER SARANAC  3+4+5=4
77        K     1     400                                                    1
78        K1          ROUTE OVER DAM AT OUTLET TO LOWER SARANAC
79        Y                                 1      1
80        Y1    1                                                    -1533       0
81        SS    0   15000   20000   51000
82        SE 1533    1540    1545    1550
83        SS 1533      60     3.5     1.5
84        SD 1537    2.65     1.5      12
85        K     1     680                                                    1
86        K1          ROUTE THRU CHEETAH AND LAKE FLOWER
87        Y                                 0      1
88        Y1    0
89        K     0     681                                                    1
90        K1          RUNOFF SUBAREA 6
```

```
 92        P          16      77      91     102     108
 93        T                                            1.0     0.1          0.067
 94        N    4.8   0.625
 95        X   -2.8   -0.18   1.6
 96        K    2     680                                 1
 97        K1         COMBINE 2 HYDROGRAPHS - INFLOW FOR LAKE FLOWER DAM   6+4=6
 98        K    1     680                                 1
 99        K1         ROUT OVER LAKE FLOWER DAM
100        Y                                1       1
101        Y1   1                                                -1528    -1
102        Y4   1528   1529    1530    1531    1532    1534    1536    1538    1540    1542
103        Y4   1544   1546    1548    1550
104        Y5   0      140     500     1010    1625    3065    4775    6725    8880    11225
105        Y5   13755  16440   19290   22285
106        SS   0      820     2800    6200    9160    18460   30560   47080
107        SE   1513   1522    1525    1528    1530    1535    1540    1545
108        $$   1528
109        SD   1533   2.65    1.5     32
110        K    99
111        A
112        A
113        A
114        A
115        A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	100
ROUTE HYDROGRAPH TO	200
RUNOFF HYDROGRAPH AT	201
COMBINE 2 HYDROGRAPHS AT	200
ROUTE HYDROGRAPH TO	200
ROUTE HYDROGRAPH TO	301
RUNOFF HYDROGRAPH AT	300
COMBINE 2 HYDROGRAPHS AT	300
ROUTE HYDROGRAPH TO	300
ROUTE HYDROGRAPH TO	400
RUNOFF HYDROGRAPH AT	402
RUNOFF HYDROGRAPH AT	500
COMBINE 3 HYDROGRAPHS AT	400
ROUTE HYDROGRAPH TO	400
ROUTE HYDROGRAPH TO	600
RUNOFF HYDROGRAPH AT	601
COMBINE 2 HYDROGRAPHS AT	600
ROUTE HYDROGRAPH TO	600
END OF NETWORK	

CMS	525.	806.	488.	329.	17624.
INCHES		1.48	3.58	7.24	16.16
MM		37.57	90.97	183.80	410.55
AC-FT		14120.	34191.	69084.	154314.
THOUS CU M		17417.	42174.	85213.	190344.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUT OVER LAKE FLOWER DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

ASTFS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-1528.	-1

STAGE	1528.00	1529.00	1530.00	1531.00	1532.00	1534.00	1536.00	1538.00	1540.00	1542.00
	1544.00	1546.00	1548.00	1550.00						
FLOW	0.	140.00	500.00	1010.00	1625.00	3065.00	4775.00	6725.00	8880.00	11225.00
	13755.00	16440.00	19290.00	22285.00						
CAPACITY=	0.	820.	2800.	6200.	9160.	18460.	30560.	47000.		
ELEVATION=	1513.	1522.	1525.	1528.	1530.	1535.	1540.	1545.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1528.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1533.0	2.7	1.5	32.

STATION 600, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES ← 1/2 PMF

CUTFLOW

1.	2.	3.	3.	4.	6.	8.	9.	11.	12.
20.	45.	111.	511.	1438.	2560.	3354.	3732.	3869.	3936.
3987.	4024.	4048.	4064.	4073.	4077.	4075.	4070.	4062.	4052.
4039.	4025.	4010.	3993.	3975.	3956.	3935.	3914.	3851.	3867.
3842.	3816.	3785.	3760.	3730.	3695.	3667.	3634.	3599.	3563.
3526.	3488.	3449.	3409.	3368.	3327.	3285.	3242.	3198.	3154.
3115.	3076.	3036.	2995.	2953.	2912.	2870.	2827.	2785.	2743.
2700.	2658.	2616.	2574.	2532.	2491.	2450.	2410.	2370.	2332.
2294.	2256.	2218.	2181.	2143.	2106.	2070.	2033.	1997.	1962.
1927.	1892.	1858.	1824.	1791.	1758.	1726.	1694.	1663.	1632.

STORAGE

6209.	6218.	6227.	6236.	6247.	6261.	6280.	6298.	6313.	6331.
6412.	6674.	7373.	9200.	12291.	15262.	16984.	17684.	17933.	18056.
18148.	18215.	18255.	18288.	18304.	18310.	18308.	18299.	18284.	18266.

17885.	17838.	17788.	17735.	17681.	17624.	17564.	17503.	17439.	17373.
17304.	17234.	17161.	17087.	17011.	16933.	16854.	16773.	16691.	16608.
16524.	16437.	16348.	16257.	16165.	16071.	15977.	15881.	15785.	15688.
15590.	15492.	15394.	15295.	15197.	15098.	15000.	14902.	14803.	14705.
14607.	14510.	14412.	14315.	14219.	14123.	14028.	13935.	13842.	13750.
13660.	13570.	13482.	13395.	13309.	13224.	13140.	13058.	12977.	12897.

STAGE

1528.0	1528.0	1528.0	1528.0	1528.0	1528.0	1528.1	1528.1	1528.1	1528.1
1528.1	1528.3	1528.8	1530.0	1531.7	1533.3	1534.2	1534.6	1534.7	1534.8
1534.8	1534.9	1534.9	1534.9	1534.9	1534.9	1534.9	1534.9	1534.9	1534.9
1534.9	1534.9	1534.9	1534.8	1534.8	1534.8	1534.8	1534.8	1534.7	1534.7
1534.7	1534.7	1534.6	1534.6	1534.6	1534.6	1534.5	1534.5	1534.5	1534.4
1534.4	1534.3	1534.3	1534.3	1534.2	1534.2	1534.1	1534.1	1534.0	1534.0
1534.0	1533.9	1533.9	1533.8	1533.8	1533.7	1533.7	1533.6	1533.6	1533.5
1533.5	1533.4	1533.4	1533.3	1533.2	1533.2	1533.1	1533.1	1533.0	1533.0
1532.9	1532.9	1532.8	1532.8	1532.7	1532.7	1532.6	1532.6	1532.5	1532.5
1532.4	1532.4	1532.3	1532.3	1532.2	1532.2	1532.1	1532.1	1532.1	1532.0

PEAK OUTFLOW IS 4077. AT TIME 78.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4077.	4075.	4065.	3982.	262961.
CMS	115.	115.	115.	113.	7446.
INCHES		0.21	0.84	2.48	6.83
MM		5.38	21.45	63.04	173.46
AC-FT		2021.	8062.	23693.	65197.
THOUS CU M		2493.	9945.	29225.	80419.

STATION 600, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES ← PMF

OUTFLOW

2.	3.	5.	7.	9.	12.	15.	19.	22.	25.
41.	91.	354.	1406.	4138.	6929.	8716.	9407.	9586.	9626.
9638.	9629.	9603.	9563.	9513.	9455.	9392.	9324.	9254.	9182.
9108.	9034.	8960.	8885.	8811.	8737.	8663.	8589.	8516.	8442.
8367.	8293.	8217.	8141.	8065.	7987.	7909.	7830.	7750.	7669.
7593.	7514.	7435.	7353.	7270.	7186.	7100.	7013.	6925.	6835.
6745.	6653.	6561.	6468.	6375.	6280.	6186.	6091.	5996.	5901.
5806.	5711.	5617.	5523.	5429.	5336.	5243.	5157.	5074.	4991.
4907.	4820.	4732.	4642.	4552.	4461.	4370.	4279.	4188.	4079.
3966.	3856.	3751.	3648.	3550.	3454.	3361.	3272.	3185.	3168.

STORAGE

6218.	6236.	6254.	6273.	6294.	6323.	6362.	6398.	6429.	6465.
6628.	7159.	8558.	12218.	18406.	24281.	27559.	28762.	29072.	29141.
29163.	29147.	29101.	29033.	28946.	28846.	28736.	28619.	28497.	28371.
28243.	28114.	27985.	27855.	27725.	27596.	27467.	27337.	27208.	27078.
26947.	26816.	26683.	26549.	26414.	26277.	26139.	25998.	25856.	25712.
25565.	25415.	25261.	25104.	24943.	24780.	24614.	24444.	24272.	24098.
23921.	23742.	23561.	23378.	23194.	23008.	22822.	22634.	22445.	22256.
22067.	21878.	21688.	21499.	21311.	21123.	20936.	20748.	20561.	20372.
20181.	19984.	19782.	19578.	19370.	19161.	18950.	18737.	18525.	18314.
18109.	17911.	17710.	17530.	17348.	17171.	16998.	16831.	16667.	16507.

STAGE

1528.0	1528.0	1528.0	1528.0	1528.1	1528.1	1528.1	1528.1	1528.2	1528.2

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO APPLIED TO FLOWS: RATIO 1 0.50	RATIO 2 1.00
HYDROGRAPH AT	100	32.90 (0.00)	1	10003. (283.27)	20007. (566.53)
ROUTED TO	200	32.90 (0.00)	1	10003. (283.27)	20007. (566.53)
HYDROGRAPH AT	201	41.50 (0.00)	1	15624. (442.43)	31248. (884.85)
2 COMBINED	200	74.40 (0.00)	1	25628. (725.69)	51255. (1451.38)
ROUTED TO	200	74.40 (0.00)	1	2862. (81.05)	6454. (182.75)
ROUTED TO	301	74.40 (0.00)	1	2862. (81.05)	6454. (182.75)
HYDROGRAPH AT	300	24.00 (0.00)	1	9456. (267.76)	18912. (535.52)
2 COMBINED	300	98.40 (0.00)	1	10393. (294.29)	21558. (610.45)
ROUTED TO	300	98.40 (0.00)	1	2466. (69.84)	5356. (151.67)
ROUTED TO	400	98.40 (0.00)	1	2466. (69.84)	5356. (151.67)
HYDROGRAPH AT	402	23.70 (0.00)	1	10471. (296.50)	20941. (593.00)
HYDROGRAPH AT	500	19.20 (0.00)	1	6950. (196.79)	13899. (393.59)
3 COMBINED	400	141.30 (0.00)	1	17900. (506.86)	36140. (1023.38)
ROUTED TO	400	141.30 (0.00)	1	3178. (89.98)	7185. (203.44)
ROUTED TO	600	141.30 (0.00)	1	3178. (89.98)	7185. (203.44)
HYDROGRAPH AT	601	37.80 (0.00)	1	14202. (402.15)	28404. (804.31)
2 COMBINED	600	179.10	1	15707.	32679.

2 COMBINED	600	179.18			
		(0.00)		(444.78)(	925.38)(
ROUTED TO	600	179.18	1	4077.	9638.
		(0.00)		(115.43)(	272.92)(

1/2 PMF PMF

SUMMARY OF DAM SAFETY ANALYSIS

UPPER SARANAC LAKE DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1573.00	1573.00	1575.00
STORAGE	0.	0.	13000.
OUTFLOW	0.	0.	1312.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1576.33	1.33	21663.	2862.	126.00	60.00	0.
1.00	1578.67	3.67	42178.	6454.	198.00	57.00	0.

SUMMARY OF DAM SAFETY ANALYSIS

OUTLET CONTROL @ MIDDLE SARANAC LAKE

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1536.00	1536.00	1540.00
STORAGE	0.	0.	6000.
OUTFLOW	0.	0.	742.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1544.54	4.54	14163.	2466.	255.00	114.00	0.
1.00	1545.99	5.99	28976.	5356.	258.00	117.00	0.

SUMMARY OF DAM SAFETY ANALYSIS

OUTLET @ LOWER SARANAC LAKE

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1533.00	1533.00	1537.00
STORAGE	0.	0.	8571.
OUTFLOW	0.	0.	1688.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1535.80	2.80	12860.	3178.	210.00	108.00	0.
1.00	1540.07	6.07	24285.	7185.	258.00	57.00	0.

LAKE FLOWER DAM
(NY-307)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1520.00	1528.00	1533.00
STORAGE	6200.	6200.	14740.
OUTFLOW	0.	0.	2342.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1534.92	1.92	18310.	4077.	152.00	70.00	0.
1.00	1539.42	6.42	29163.	9638.	258.00	63.00	0.

DD-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	2/		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		WL	7/23/81

SUBBASIN — LOWER :

ENDER UNIT HYDROGRAPH :

LAG TIME : $t_p = C_t (L \times L_{CA})^{0.3}$

$C_t = 2.0$ $L = 54.65$ $L_{CA} = 33.75$

$t_p = 19.09$ HRS

UNIT RAINFALL DURATION : $t_r = \frac{t_p}{5.5}$

$t_r = 3.47$ HRS USE $t_R = 3$ HRS ←

ADJUSTED LAG TIME : $TP = t_p + 0.25(t_R - t_r)$

$TP = 19.09 + 0.25(3 - 3.47)$

$TP = 18.97$ HRS USE $TP = 19$ HRS ←

PEAKING COEFFICIENT : CP

FOR 2 ADJACENT WATERSHEDS :

REF: CORPS ENGRS. UPPER HUDSON & MOHAWK RIVER BASIN STUDY

SUBBASIN 36 CP = 0.55

" 38 CP = 0.56

USE CP = 0.56 ←

88-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	3/		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		WL	7/23/81

RAINFALL INFILTRATION - SOIL LOSS RATES:

INITIAL LOSS = 1.0 INS. CONSTANT LOSS = 0.10 INS/HR ←

BASE FLOW:

RTIOR = 1.3 ← REF: CORPS EXCEL UPPER HUDSON & MOHAWK RIVER BASIN STUDY

STARTQ = 858 cfs

AVE Q = 835 cfs (63YRS + GAGE DATA) → 1.37 CSM

Q = 858 cfs (@ 2CSM + LOWER SUBBASIN)

QRCSN = 0.2

RAINFALL - HRR # 33:

ZONE 1 200 SQ MI / 24 HR INDEX PRF = 16"

ADJUSTMENT FOR AREA - DURATION

	6	12	24	48
% OF INDEX:	59	74.3	86	90

DB-15-1 (3/78)
Formerly GA-17

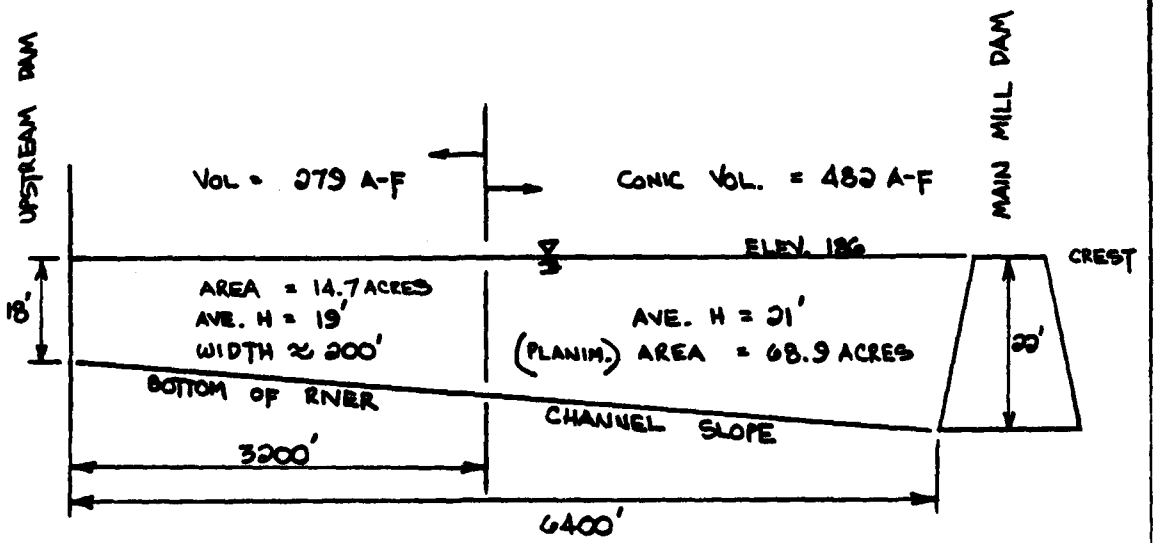
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	4/		
SUBJECT		**COMPUTED BY**	**DATE**
STORAGE VOLUME :		WL	7/23/81

LOCATION	ELEV.	ΔH	AREA	ΔA	ΔV	VOL.	
	164					0	
		10					
GATE SILL	174					310	
		12			451		
SPILLCREST	186		83.6			761	←
		2.5			209		
TOP FLASHBDS	188.5		83.6			970	
		5.3			443		
TOP LT. EMB.	193.8		83.6			1413	← TOP DAM
		9.2			769		
	203		83.6			2182	

PROJECTED



09-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	5/		
SUBJECT		**COMPUTED BY**	**DATE**
SPILLWAY DISCHARGES		WL	7/24/81

WEIR FLOW: $Q = CLH^{3/2}$

NO FLASHBOARDS $C = 3.2$

$L = 225'$

$(\Delta H = H - 4.8)$

	ELEV.	H	SPILLWAY Q	ΔH	L	Q	TOTAL Q
CREST	1186	—	—				
		0.5	254				
		1	720				
		1.5	1320				
		2	2036				
TOP BOARDS		2.5	2846				
		3	3741				
		4	5760				
TOP GATE		4.3	6420				
		4.8	7571	—	$C = 2.63$ $L = 10$	—	7571
		5	8049	0.2		2	8051
		6	10581	1.2		34	10615
		7	13334	2.2		85	13419
TOP EMB		7.8	15684	3		136	15820 ←
		8	16291	3.2		150	16441
		9	19440	4.2		226	19666
		9.1	19764	4.3		234	19998
BOT. WINDOW		9.8	22088	5		294	22382

DD-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	6/		
SUBJECT		**COMPUTED BY**	**DATE**
FLOOD GATE - DISCHARGES		WL	7/24/81

ORIFICE FLOW: $Q = CA\sqrt{2gH}$

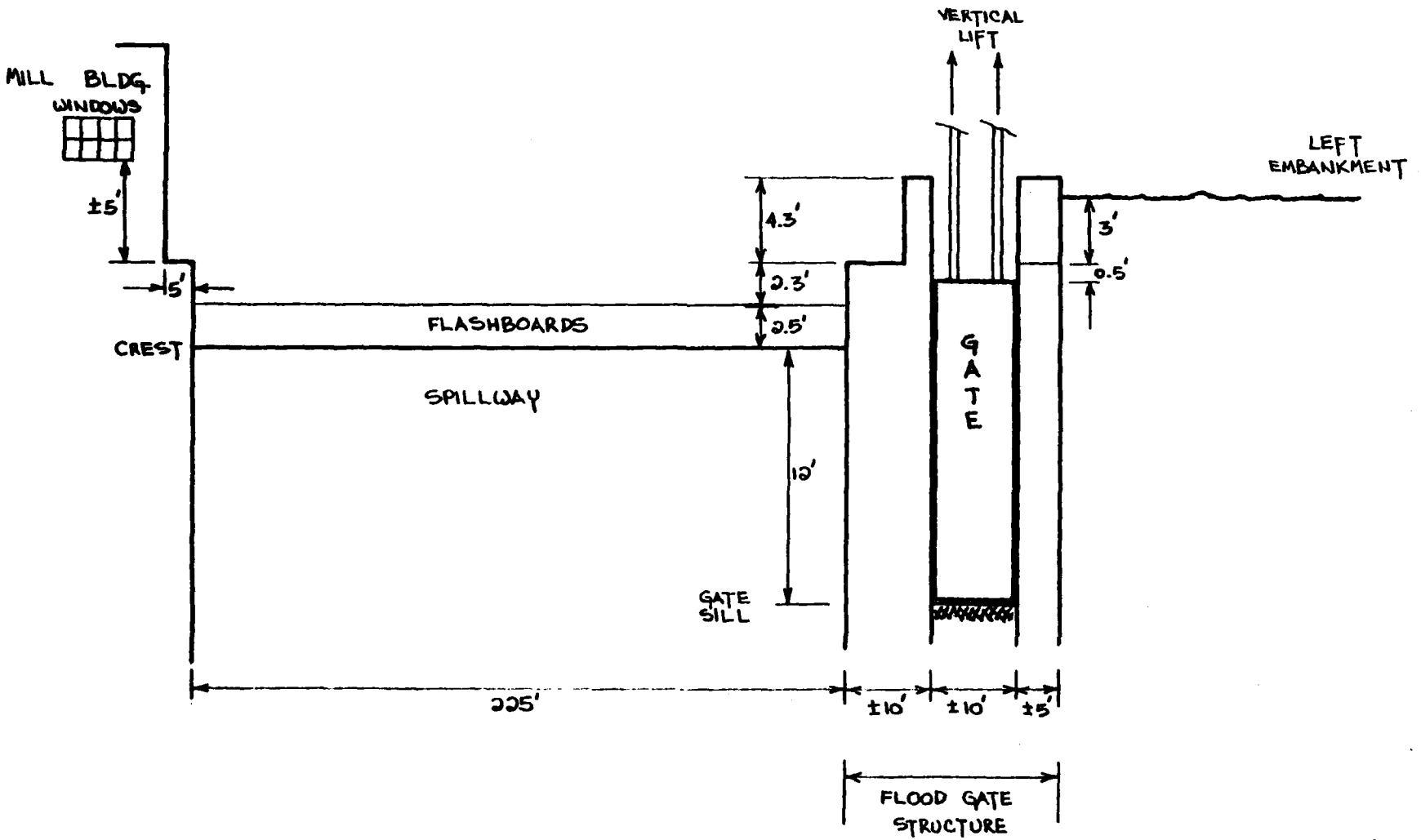
$C = 0.6$

FULLY OPEN $A = 120 = 10 \times 12$

W/ GATE BOTTOM @ SPILLCREST (ELEV 186)

$Q = 577.8\sqrt{H}$ H - MEASURED FROM ELEV. 180

	ELEV.	H	Q
CREST	186	6	1415
		6.5	1473
		7	1528
		7.5	1582
		8	1634
		8.5	1684
		9	1733
		10	1827
		10.3	1854
		10.8	1898
		11	1916
		12	2001
		13	2083
TOP EMB		13.8	2146



MAIN MILL DAM
NY-262

FIELD MEASUREMENTS - 6/81

GA

DD-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
MAIN MILL DAM	7/		
SUBJECT		**COMPUTED BY**	**DATE**
		WL	7/24/81

EMBANKMENT OVERTOPPING:

CREST L = 715'

SPILLWAY = 225'
MILL BLDG = 160'

∴ OVERTOPPING L = 330'

WEIR FLOW

$Q = CLH^{3/2}$

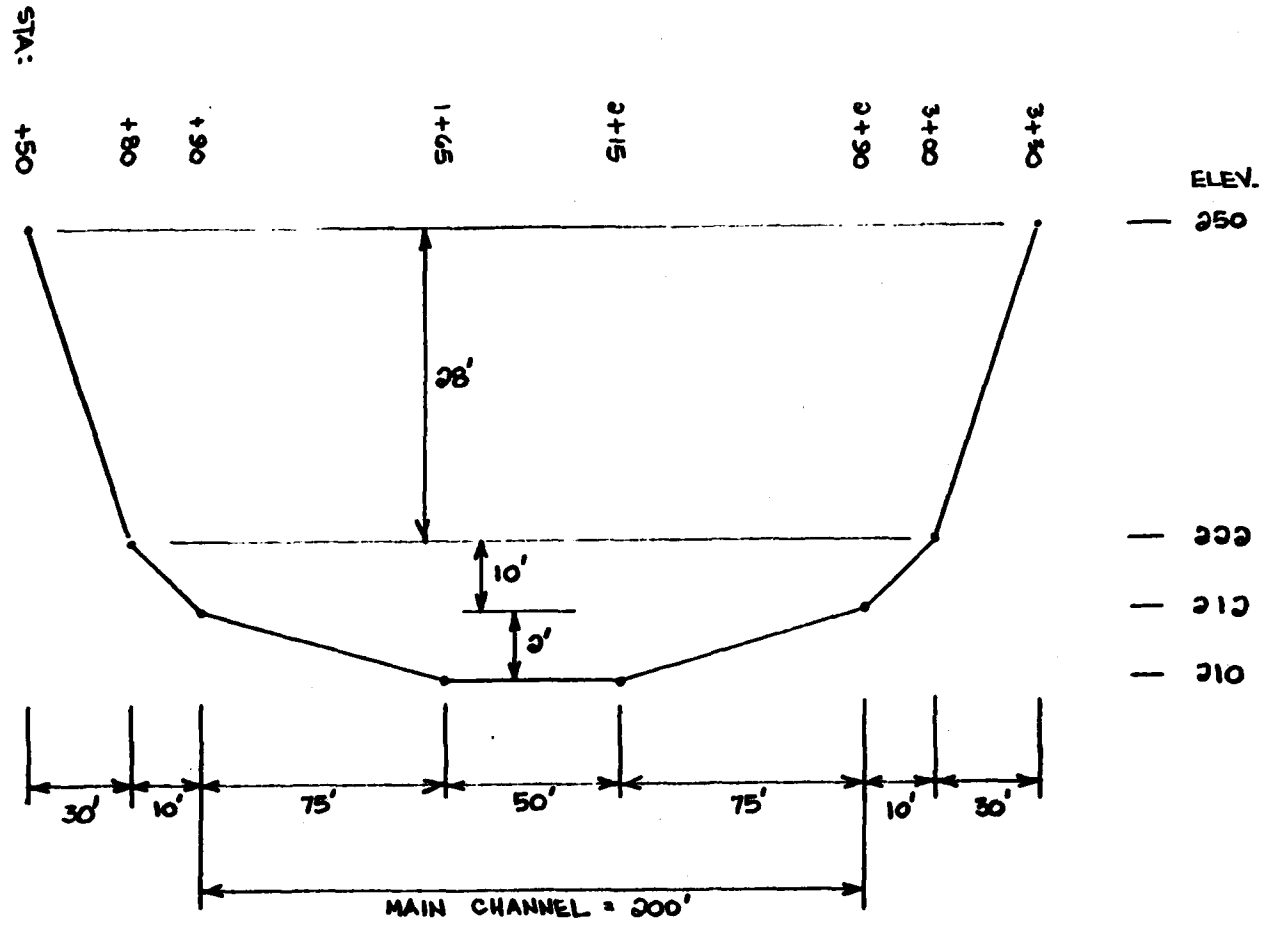
C = 2.63

@ ELEV. 193.8

MAIN MILL DAM
NY-269

SARANAC RIVER - MAIN STEM

[APPROX. X-SECTION - HEC-1DB INPUT]



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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********

**********
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
**********

    1          A1  NY-262    MAIN MILL DAM                                    LAKE CHAMPLAIN BASIN
    2          A2            DEC 236A-234 CHAMPLAIN -- SARANAC RIVER          CLINTON COUNTY
    3          A3            IMPERIAL PAPER CO.                               SNYDER UM MI/ SUBBASIN
    4          B    120       3       0       0       0       0       0       0       0       0
    5          B1     5
    6          J      1       8       1
    7          J1  0.20    0.21    0.22    0.23    0.24    0.25    0.50       1
    8          K      0  LKFLWR                                       1
    9          K1  PMF ROUTED OUTFLOW LAGGED HYDROGRAPH -- LAKE FLOWER DAM -- PHASE 1-DALE
   10          M     -1             179                                                   1
   11          N    354     354     354     354     354     354     354     354     354     354
   12          N    354     354     354     354     354     354     354     354    1486    4138
   13          N   6929    8716    9407    9586    9624    9638    9629    9683    9563    9513
   14          N   9455    9392    9324    9254    9182    9108    9034    8960    8885    8811
   15          N   8737    8663    8589    8516    8442    8367    8293    8217    8141    8065
   16          N   7987    7909    7830    7750    7669    7593    7514    7435    7353    7270
   17          N   7186    7100    7013    6925    6835    6745    6653    6561    6468    6375
   18          N   6280    6186    6091    5996    5901    5806    5711    5617    5523    5429
   19          N   5336    5243    5157    5074    4991    4907    4820    4732    4642    4552
   20          N   4461    4370    4279    4188    4079    3966    3856    3751    3648    3550
   21          N   3454    3361    3272    3185    3108    3033    2958    2883    2808    2733
   22          N   2658    2583    2508    2433    2358    2283    2208    2133    2058    1983
   23          K      1  SARRIV                                       1
   24          K1            CHANNEL ROUTING -- SARANAC RIVER -- LAKE FLOWER TO DAM
   25          Y                                     1       1
   26          Y1     5
   27          Y6  0.055   0.045   0.055     210     250  288552 0.00462
   28          Y7     50     250      80     222      90     212     165     210     215     210
   29          Y7    290     212     300     222     330     250
   30          K      0  LWRDSN                                       1
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31   KI          RUNOFF -- LOWER SUBBASIN
32   M    1      1     429          608                              1
33   P           16    53    74.5   85    92
34   T                                                 1.0    0.1
35   W    19     0.56
36   X    858    -0.2  1.3
37   K    2      DAM                                    1
38   KI          COMBINED HYDROGRAPHS AT DAM -- INFLOW
39   K    1      DAM                                    1
40   KI          ROUTED OUTFLOW - DAM - FLOOD GATE CLOSED        NO[redacted] FLASHBOARDS
41   Y                                 1     1
42   Y1   1                                                -186   -1
43   Y4   174    186   186.5   187   187.5   188   188.5   189    190   190.3
44   Y4   190.8  191   192     193   193.8   194   195     195.1  195.8
45   Y5   0      0     254     720   1322    2836  2846    3741   5760  6428
46   Y5   7571   8051  10615   13419 15820   16441 19666   19998  22382
47   SS   0      310   761     970   1413    2182
48   SE   164    174   186     188.5 193.8   283
49   SS   186
50   SD   193.8  2.63  1.5     330
51   K    99
52   A
53   A
54   A
55   A
56   A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	LKFLWH
ROUTE HYDROGRAPH TO	SARRIV
RUNOFF HYDROGRAPH AT	LWRBSN
COMBINE 2 HYDROGRAPHS AT	DAM
ROUTE HYDROGRAPH TO	DAM

END OF NETWORK

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**********                                        **********
FLOOD HYDROGRAPH PACKAGE (HEC-1)                  NEW YORK STATE
DAM SAFETY VERSION     JULY 1978                  DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                   FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL APR 79
**********                                        **********

RUN  DATE 07/28/81
                    NY-262     MAIN MILL DAM                          LAKE CHAMPLAIN BASIN
                               DEC 256A-234 CHAMPLAIN -- SARANAC RIVER CLINTON COUNTY
                               IMPERIAL PAPER CO.                     SNYDER UH WI/ SUBBASIN

                                        JOB SPECIFICATION
          NO      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
         120       3        0        0        8        0        0        0        0        0
                                   JOPER      NUT   LROPT    TRACE
                                       5        0        0        0

                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                   NPLAN= 1 NRTIO= 8 LRTIO= 1
                RTIOS=   0.20    0.21    0.22    0.23    0.24    0.25    0.50    1.00

**********        **********      **********      **********      **********

                                  SUB-AREA RUNOFF COMPUTATION

                PMF ROUTED OUTFLOW LAGGED HYDROGRAPH -- LAKE FLOWER DAM -- PHASE 1-DALE
                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             LKFLWR       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
          IHYDG    IUHG    TAREA    SNAP    TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             -1       0  179.00       0.  179.00      0.      0.       0       1       0

                                        INPUT HYDROGRAPH
    354.    354.    354.    354.    354.    354.    354.    354.    354.    354.
    354.    354.    354.    354.    354.    354.    354.    354.   1406.   4138.
   6929.   8716.   9407.   9586.   9626.   9638.   9629.   9603.   9563.   9513.
   9455.   9392.   9324.   9254.   9182.   9108.   9034.   8960.   8885.   8811.
   8737.   8663.   8589.   8516.   8442.   8367.   8293.   8217.   8141.   8065.
   7987.   7909.   7830.   7750.   7669.   7593.   7514.   7435.   7353.   7270.
   7186.   7100.   7013.   6925.   6835.   6745.   6653.   6561.   6468.   6375.
   6280.   6186.   6091.   5996.   5901.   5806.   5711.   5617.   5523.   5429.
   5336.   5243.   5157.   5074.   4991.   4907.   4820.   4732.   4642.   4552.
   4461.   4370.   4279.   4188.   4079.   3966.   3856.   3751.   3648.   3550.
   3454.   3361.   3272.   3185.   3108.   3033.   2958.   2883.   2808.   2733.
   2658.   2583.   2508.   2433.   2358.   2283.   2208.   2133.   2058.   1983.

                                  PEAK    6-HOUR   24-HOUR   72-HOUR  TOTAL VOLUME
                          CFS     9638.    9633.     9574.     9144.      624698.
                          CMS      273.     273.      271.      259.       17689.
                       INCHES               0.50      1.99      5.78       16.25
                           MM              12.72     50.55    144.84      412.38
                        AC-FT              4777.    18989.    54411.     154884.
                     THOUS CU M            5892.    23423.    67115.     191046.

                          HYDROGRAPH AT STALKFLWR FOR PLAN 1, RTIO 1
```

71.	71.	71.	71.	71.	71.	71.	71.	71.	71.
71.	71.	71.	71.	71.	71.	71.	71.	281.	826.
1386.	1743.	1881.	1917.	1925.	1928.	1926.	1921.	1913.	1903.
1891.	1878.	1865.	1851.	1836.	1822.	1807.	1792.	1777.	1762.
1747.	1733.	1718.	1703.	1688.	1673.	1659.	1643.	1628.	1613.
1597.	1582.	1566.	1550.	1534.	1519.	1503.	1487.	1471.	1454.
1437.	1420.	1403.	1385.	1367.	1349.	1331.	1312.	1294.	1275.
1256.	1237.	1218.	1199.	1180.	1161.	1142.	1123.	1105.	1086.
1067.	1049.	1031.	1015.	998.	981.	964.	946.	928.	910.
892.	874.	856.	838.	816.	793.	771.	750.	730.	710.
691.	672.	654.	637.	622.	607.	592.	577.	562.	547.
532.	517.	502.	487.	472.	457.	442.	427.	412.	397.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1928.	1927.	1915.	1829.	124939.
CMS	55.	55.	54.	52.	3538.
INCHES		0.18	0.48	1.14	3.25
MM		2.54	10.11	28.97	82.46
AC-FT		955.	3798.	10882.	30977.
THOUS CU M		1178.	4685.	13423.	38209.

HYDROGRAPH AT STALKFLUR FOR PLAN 1, RTIO 2

74.	74.	74.	74.	74.	74.	74.	74.	74.	74.
74.	74.	74.	74.	74.	74.	74.	74.	295.	867.
1455.	1836.	1975.	2013.	2021.	2024.	2022.	2017.	2008.	1998.
1986.	1972.	1958.	1943.	1928.	1913.	1897.	1882.	1866.	1850.
1835.	1819.	1804.	1788.	1773.	1757.	1742.	1726.	1710.	1694.
1677.	1661.	1644.	1628.	1610.	1595.	1578.	1561.	1544.	1527.
1509.	1491.	1473.	1454.	1435.	1416.	1397.	1378.	1358.	1339.
1319.	1299.	1279.	1259.	1239.	1219.	1199.	1180.	1160.	1140.
1121.	1101.	1083.	1066.	1048.	1030.	1012.	994.	975.	956.
937.	918.	899.	879.	857.	833.	810.	788.	766.	746.
725.	706.	687.	669.	653.	637.	621.	605.	590.	574.
558.	542.	527.	511.	495.	479.	464.	448.	432.	416.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2024.	2023.	2010.	1920.	131186.
CMS	57.	57.	57.	54.	3715.
INCHES		0.11	0.42	1.20	3.41
MM		2.67	10.62	30.42	86.58
AC-FT		1003.	3988.	11426.	32526.
THOUS CU M		1237.	4919.	14094.	40120.

HYDROGRAPH AT STALKFLUR FOR PLAN 1, RTIO 3

78.	78.	78.	78.	78.	78.	78.	78.	78.	78.
78.	78.	78.	78.	78.	78.	78.	78.	309.	909.
1524.	1918.	2070.	2109.	2118.	2120.	2118.	2113.	2104.	2093.
2080.	2066.	2051.	2036.	2020.	2004.	1987.	1971.	1955.	1938.
1922.	1906.	1890.	1874.	1857.	1841.	1824.	1808.	1791.	1774.
1757.	1740.	1723.	1705.	1687.	1670.	1653.	1636.	1618.	1599.
1581.	1562.	1543.	1524.	1504.	1484.	1464.	1443.	1425.	1403.
1382.	1361.	1340.	1319.	1298.	1277.	1256.	1236.	1215.	1194.
1174.	1153.	1139.	1116.	1098.	1080.	1060.	1041.	1021.	1001.
981.	961.	941.	921.	897.	873.	848.	825.	803.	781.
768.	739.	720.	701.	684.	667.	651.	634.	618.	601.
585.	568.	552.	535.	519.	502.	486.	469.	453.	436.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2120.	2119.	2106.	2012.	137433.

1578.	1547.	1523.	1499.	1475.	1452.	1428.	1404.	1381.	1357.
1334.	1311.	1289.	1269.	1248.	1227.	1205.	1183.	1161.	1138.
1115.	1093.	1070.	1047.	1028.	992.	964.	938.	912.	888.
864.	848.	818.	796.	777.	758.	740.	721.	702.	683.
665.	646.	627.	608.	590.	571.	552.	533.	515.	496.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2410.	2408.	2393.	2286.	156174.
CMS	68.	68.	68.	65.	4422.
INCHES		0.13	0.50	1.43	4.06
MM		3.18	12.64	36.21	103.07
AC-FT		1194.	4747.	13603.	38721.
THOUS CU M		1473.	5856.	16779.	47762.

HYDROGRAPH AT STALKFLUR FOR PLAN 1, RTIO 7

177.	177.	177.	177.	177.	177.	177.	177.	177.	177.
177.	177.	177.	177.	177.	177.	177.	177.	783.	2865.
3665.	4358.	4704.	4793.	4813.	4819.	4815.	4802.	4782.	4757.
4728.	4696.	4662.	4627.	4591.	4554.	4517.	4480.	4443.	4406.
4369.	4332.	4295.	4258.	4221.	4184.	4147.	4109.	4071.	4033.
3994.	3955.	3915.	3875.	3835.	3797.	3757.	3718.	3677.	3635.
3593.	3550.	3507.	3463.	3418.	3373.	3327.	3281.	3234.	3188.
3140.	3093.	3046.	2998.	2951.	2903.	2856.	2809.	2762.	2715.
2668.	2622.	2579.	2537.	2496.	2454.	2410.	2366.	2321.	2276.
2231.	2185.	2140.	2094.	2048.	1983.	1928.	1876.	1824.	1775.
1727.	1681.	1636.	1593.	1554.	1517.	1479.	1442.	1404.	1367.
1329.	1292.	1254.	1217.	1179.	1142.	1104.	1067.	1029.	992.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4819.	4816.	4787.	4572.	312349.
CMS	136.	136.	136.	129.	8845.
INCHES		0.25	1.00	2.85	8.12
MM		6.36	25.27	72.42	206.15
AC-FT		2388.	9495.	27206.	77442.
THOUS CU M		2946.	11711.	33558.	95523.

HYDROGRAPH AT STALKFLUR FOR PLAN 1, RTIO 8

354.	354.	354.	354.	354.	354.	354.	354.	354.	354.
354.	354.	354.	354.	354.	354.	354.	354.	1486.	4130.
6929.	8716.	9487.	9586.	9626.	9638.	9629.	9603.	9563.	9513.
9455.	9392.	9324.	9254.	9182.	9108.	9034.	8960.	8885.	8811.
8737.	8663.	8589.	8516.	8442.	8367.	8293.	8217.	8141.	8065.
7987.	7909.	7830.	7750.	7669.	7593.	7514.	7435.	7353.	7270.
7186.	7100.	7013.	6925.	6835.	6745.	6653.	6561.	6468.	6375.
6280.	6186.	6091.	5996.	5901.	5806.	5711.	5617.	5523.	5429.
5336.	5243.	5157.	5074.	4991.	4907.	4820.	4732.	4642.	4552.
4461.	4370.	4279.	4188.	4079.	3966.	3856.	3751.	3648.	3550.
3454.	3361.	3272.	3185.	3100.	3033.	2958.	2883.	2808.	2733.
2658.	2583.	2508.	2433.	2358.	2283.	2208.	2133.	2058.	1983.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9638.	9633.	9574.	9144.	624698.
CMS	273.	273.	271.	259.	17689.
INCHES		0.50	1.99	5.78	16.23
MM		12.72	50.55	144.84	412.38
AC-FT		4777.	18989.	54411.	154884.
THOUS CU M		5892.	23423.	67115.	191046.

HYDROGRAPH ROUTING

CHANNEL ROUTING -- SARANAC RIVER -- LAKE FLOWER TO DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
SARRIV	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
5	0	0	0.	0.	0.	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELMVT	ELMAX	RLNTH	SEL
0.0550	0.0450	0.0550	210.0	250.0	288552.	0.00462

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

50.00 250.00 80.00 222.00 90.00 212.00 165.00 210.00 215.00 210.00
290.00 212.00 300.00 222.00 330.00 250.00

STORAGE	0.	1705.59	4617.04	7497.21	10436.10	13433.70	16490.22	19608.62	22789.93	26034.16
	29341.38	32711.35	36144.32	39640.20	43198.99	46820.70	50505.32	54252.85	58063.29	61936.65
OUTFLOW	0.	746.94	3570.65	7912.15	13558.96	20395.25	28344.98	37355.83	47391.08	58428.35
	70419.57	83369.27	97253.53	112059.18	127775.25	144392.59	161903.54	180301.68	199581.67	219739.84
STAGE	210.00	212.11	214.21	216.32	218.42	220.53	222.63	224.74	226.84	228.95
	231.05	233.16	235.26	237.37	239.47	241.58	243.68	245.79	247.89	250.00
FLOW	0.	746.94	3570.65	7912.15	13558.96	20395.25	28344.98	37355.83	47391.08	58428.35
	70419.57	83369.27	97253.53	112059.18	127775.25	144392.59	161903.54	180301.68	199581.67	219739.84

STATION SARRIV, PLAN 1, RTIO 1

OUTFLOW

0.	0.	2.	4.	8.	14.	21.	28.	35.	41.
47.	52.	57.	60.	63.	65.	66.	68.	69.	70.
75.	89.	124.	203.	355.	652.	1275.	1669.	1827.	1888.
1908.	1912.	1908.	1900.	1889.	1877.	1864.	1850.	1836.	1822.
1807.	1792.	1778.	1763.	1748.	1733.	1718.	1704.	1689.	1674.
1659.	1644.	1628.	1613.	1598.	1582.	1566.	1550.	1535.	1519.
1503.	1487.	1471.	1454.	1437.	1420.	1403.	1385.	1367.	1349.
1331.	1313.	1294.	1275.	1257.	1238.	1219.	1200.	1181.	1162.
1143.	1124.	1105.	1087.	1068.	1050.	1033.	1016.	999.	981.
964.	946.	929.	911.	893.	874.	855.	836.	815.	794.
774.	759.	749.	744.	740.	733.	725.	714.	703.	690.
677.	662.	648.	633.	618.	603.	588.	573.	557.	542.

STOR

0.	0.	1.	2.	4.	7.	10.	13.	17.	20.
23.	25.	27.	29.	30.	31.	32.	33.	33.	34.
36.	43.	60.	98.	171.	313.	465.	543.	575.	587.

591.	592.	591.	589.	587.	585.	583.	580.	577.	574.
571.	568.	565.	562.	559.	556.	553.	550.	547.	544.
541.	538.	535.	532.	529.	526.	523.	520.	517.	513.
510.	507.	504.	500.	497.	494.	490.	487.	483.	479.
476.	472.	468.	465.	461.	457.	453.	450.	446.	442.
438.	434.	431.	427.	423.	420.	416.	413.	409.	406.
403.	399.	395.	392.	388.	385.	381.	377.	373.	369.
365.	361.	359.	358.	356.	352.	348.	344.	338.	332.
325.	318.	311.	304.	297.	290.	283.	275.	268.	261.

STAGE

210.0	210.0	210.0	210.0	210.0	210.0	210.1	210.1	210.1	210.1
210.1	210.1	210.2	210.2	210.2	210.2	210.2	210.2	210.2	210.2
210.2	210.2	210.4	210.6	211.0	211.0	212.5	212.8	212.9	213.0
213.0	213.0	213.0	213.0	213.0	212.9	212.9	212.9	212.9	212.9
212.9	212.9	212.9	212.9	212.9	212.8	212.8	212.8	212.8	212.8
212.8	212.8	212.8	212.8	212.7	212.7	212.7	212.7	212.7	212.7
212.7	212.7	212.6	212.6	212.6	212.6	212.6	212.6	212.6	212.6
212.5	212.5	212.5	212.5	212.5	212.5	212.5	212.4	212.4	212.4
212.4	212.4	212.4	212.4	212.3	212.3	212.3	212.3	212.3	212.3
212.3	212.3	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.1
212.1	212.1	212.1	212.1	212.1	212.1	212.0	212.0	211.9	211.9
211.9	211.9	211.8	211.8	211.7	211.7	211.7	211.6	211.6	211.5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1912.	1910.	1891.	1808.	120318.
CMS	54.	54.	54.	51.	3407.
INCHES		0.18	0.39	1.12	3.13
MM		2.52	9.98	28.51	79.41
AC-FT		947.	3750.	10711.	29831.
THOUS CU M		1168.	4626.	13212.	36796.

MAXIMUM STORAGE = 592.

MAXIMUM STAGE IS 213.0

STATION SARRIV, PLAN 1, RTIO 2

OUTFLOW

0.	0.	2.	4.	9.	15.	22.	29.	37.	43.
50.	55.	59.	63.	66.	68.	70.	71.	72.	74.
78.	93.	131.	219.	397.	724.	1437.	1783.	1927.	1985.
2005.	2008.	2003.	1995.	1984.	1971.	1957.	1943.	1928.	1913.
1897.	1882.	1866.	1851.	1835.	1820.	1804.	1789.	1773.	1757.
1742.	1726.	1710.	1694.	1678.	1661.	1645.	1628.	1611.	1595.
1578.	1561.	1544.	1527.	1509.	1491.	1473.	1454.	1436.	1417.
1397.	1378.	1359.	1339.	1319.	1300.	1280.	1260.	1240.	1220.
1200.	1180.	1161.	1141.	1122.	1103.	1084.	1066.	1048.	1030.
1012.	994.	975.	956.	937.	918.	898.	877.	856.	833.
811.	790.	771.	756.	747.	744.	738.	731.	723.	712.
701.	688.	675.	660.	646.	631.	615.	600.	585.	569.

STOR

0.	0.	1.	2.	4.	7.	10.	14.	18.	21.
24.	26.	29.	30.	32.	33.	34.	34.	35.	35.
38.	45.	63.	105.	191.	348.	497.	566.	595.	607.
610.	611.	610.	608.	606.	604.	601.	598.	595.	592.
589.	586.	583.	580.	577.	574.	570.	567.	564.	561.
558.	555.	552.	548.	545.	542.	538.	535.	532.	529.
525.	522.	518.	515.	511.	508.	504.	500.	497.	493.

489.	485.	481.	477.	474.	470.	466.	462.	458.	454.
450.	446.	442.	438.	434.	430.	427.	423.	419.	416.
412.	408.	405.	401.	397.	393.	389.	385.	381.	376.
372.	368.	364.	361.	359.	357.	355.	352.	347.	343.
337.	331.	324.	318.	310.	303.	296.	288.	281.	274.

STAGE

210.0	210.0	210.0	210.0	210.0	210.0	210.1	210.1	210.1	210.1
210.1	210.2	210.2	210.2	210.2	210.2	210.2	210.2	210.2	210.2
210.2	210.3	210.4	210.6	211.1	212.0	212.6	212.9	213.0	213.0
213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0
213.0	213.0	212.9	212.9	212.9	212.9	212.9	212.9	212.9	212.9
212.8	212.8	212.8	212.8	212.8	212.8	212.8	212.8	212.7	212.7
212.7	212.7	212.7	212.7	212.7	212.7	212.6	212.6	212.6	212.6
212.6	212.6	212.6	212.5	212.5	212.5	212.5	212.5	212.5	212.5
212.4	212.4	212.4	212.4	212.4	212.4	212.4	212.3	212.3	212.3
212.3	212.3	212.3	212.3	212.2	212.2	212.2	212.2	212.2	212.2
212.2	212.1	212.1	212.1	212.1	212.1	212.1	212.1	212.0	212.0
212.0	211.9	211.9	211.9	211.8	211.8	211.7	211.7	211.6	211.6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2008.	2006.	1987.	1891.	126335.
CMS	57.	57.	56.	54.	3577.
INCHES		0.10	0.41	1.18	3.28
MM		2.65	10.49	29.96	83.38
AC-FT		995.	5940.	11254.	31323.
THOUS CU M		1227.	4860.	13881.	38636.

MAXIMUM STORAGE = 611.

MAXIMUM STAGE IS 213.0

STATION SARRIV. PLAN 1. RTIO 3

OUTFLOW

0.	0.	2.	5.	9.	15.	23.	30.	38.	46.
52.	58.	62.	66.	69.	71.	73.	74.	75.	77.
82.	98.	138.	234.	441.	842.	1563.	1887.	2026.	2082.
2101.	2104.	2099.	2090.	2078.	2065.	2051.	2035.	2020.	2004.
1988.	1972.	1955.	1939.	1923.	1906.	1890.	1874.	1858.	1841.
1825.	1808.	1791.	1774.	1757.	1740.	1723.	1706.	1688.	1671.
1653.	1636.	1618.	1599.	1581.	1562.	1543.	1524.	1504.	1484.
1464.	1444.	1423.	1403.	1382.	1361.	1341.	1320.	1299.	1278.
1257.	1236.	1216.	1195.	1175.	1155.	1136.	1117.	1098.	1080.
1060.	1041.	1022.	1002.	982.	962.	941.	919.	896.	873.
850.	827.	805.	784.	766.	753.	746.	742.	737.	729.
720.	710.	698.	685.	672.	657.	642.	627.	611.	595.

STOR

0.	0.	1.	2.	4.	7.	11.	15.	18.	22.
25.	28.	30.	32.	33.	34.	35.	36.	36.	37.
39.	47.	66.	112.	212.	378.	522.	587.	615.	626.
630.	630.	629.	627.	625.	622.	620.	617.	614.	610.
607.	604.	601.	597.	594.	591.	588.	584.	581.	578.
574.	571.	568.	564.	561.	558.	554.	551.	547.	544.
540.	537.	533.	529.	526.	522.	518.	514.	510.	506.
502.	498.	494.	490.	486.	482.	478.	474.	469.	465.
461.	457.	453.	449.	445.	441.	437.	433.	429.	426.
422.	418.	414.	410.	406.	402.	398.	394.	389.	384.
380.	375.	371.	366.	363.	360.	359.	357.	354.	351.

212.4	212.4	212.4	212.4	212.4	212.4	212.3	212.3	212.3	212.3
212.3	212.2	212.2	212.2	212.2	212.2	212.2	212.1	212.1	212.1
212.1	212.1	212.1	212.1	212.1	212.0	212.0	212.0	211.9	211.9

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2391.	2389.	2368.	2254.	150430.
CMS	68.	68.	67.	64.	4260.
INCHES		0.12	0.49	1.41	3.91
MM		3.15	12.50	35.71	99.28
AC-FT		1185.	4697.	13414.	37297.
THOUS CU M		1461.	5793.	16546.	46005.

MAXIMUM STORAGE = 688.

MAXIMUM STAGE IS 213.3

STATION SARRIV, PLAN 1, RTIO 7

OUTFLOW

0.	1.	4.	10.	21.	35.	51.	69.	87.	103.
118.	131.	141.	150.	157.	162.	166.	169.	172.	175.
188.	244.	474.	1370.	2873.	4085.	4716.	4799.	4811.	4805.
4791.	4770.	4745.	4716.	4684.	4650.	4615.	4579.	4542.	4505.
4468.	4431.	4394.	4357.	4320.	4283.	4246.	4209.	4171.	4134.
4096.	4058.	4020.	3981.	3941.	3902.	3862.	3823.	3783.	3744.
3704.	3663.	3622.	3585.	3558.	3533.	3499.	3459.	3417.	3372.
3327.	3281.	3235.	3188.	3141.	3094.	3047.	2999.	2952.	2905.
2857.	2810.	2763.	2717.	2671.	2626.	2582.	2539.	2496.	2454.
2410.	2366.	2322.	2277.	2232.	2186.	2138.	2089.	2037.	1984.
1931.	1879.	1828.	1779.	1731.	1685.	1640.	1598.	1558.	1519.
1481.	1443.	1405.	1368.	1330.	1293.	1255.	1218.	1180.	1143.

STOR

0.	0.	2.	5.	10.	17.	25.	33.	42.	50.
57.	63.	68.	72.	75.	78.	80.	81.	82.	84.
91.	117.	228.	484.	784.	992.	1075.	1086.	1088.	1087.
1085.	1083.	1079.	1075.	1071.	1067.	1062.	1057.	1052.	1047.
1042.	1038.	1033.	1028.	1023.	1018.	1013.	1008.	1003.	998.
993.	988.	983.	978.	973.	967.	962.	957.	952.	946.
941.	936.	930.	925.	921.	916.	909.	901.	893.	884.
875.	866.	856.	847.	838.	828.	819.	809.	800.	790.
781.	771.	762.	753.	744.	735.	726.	717.	709.	700.
691.	683.	674.	665.	656.	647.	637.	627.	617.	606.
596.	585.	575.	565.	556.	547.	538.	529.	521.	513.
506.	498.	491.	483.	476.	468.	461.	453.	446.	438.

STAGE

210.0	210.0	210.0	210.0	210.1	210.1	210.1	210.2	210.2	210.3
210.3	210.4	210.4	210.4	210.4	210.5	210.5	210.5	210.5	210.5
210.5	210.7	211.3	212.6	213.7	214.5	214.8	214.8	214.8	214.8
214.8	214.8	214.8	214.8	214.8	214.7	214.7	214.7	214.7	214.7
214.6	214.6	214.6	214.6	214.6	214.6	214.5	214.5	214.5	214.5
214.5	214.4	214.4	214.4	214.4	214.4	214.4	214.3	214.3	214.3
214.3	214.3	214.2	214.2	214.2	214.2	214.2	214.1	214.1	214.1
214.0	214.0	214.0	213.9	213.9	213.9	213.8	213.8	213.7	213.7
213.7	213.6	213.6	213.6	213.5	213.5	213.5	213.4	213.4	213.4
213.3	213.3	213.3	213.2	213.2	213.2	213.1	213.1	213.1	213.0
213.0	212.9	212.9	212.9	212.8	212.8	212.8	212.7	212.7	212.7
212.7	212.6	212.6	212.6	212.5	212.5	212.5	212.5	212.4	212.4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4811.	4806.	4767.	4530.	303932.
CMS	136.	136.	135.	128.	8606.
INCHES		0.25	0.99	2.82	7.90
MM		6.34	25.17	71.75	200.59
AC-FT		2383.	9455.	26954.	75355.
THOUS CU M		2940.	11663.	33247.	92949.

MAXIMUM STORAGE = 1088.

MAXIMUM STAGE IS 214.8

STATION SARRIV, PLAN 1, RTIO 8

OUTFLOW

0.	2.	8.	21.	42.	70.	103.	139.	174.	207.
236.	262.	283.	300.	314.	324.	332.	338.	343.	352.
484.	762.	2805.	6114.	8663.	9558.	9614.	9628.	9623.	9600.
9563.	9515.	9459.	9396.	9330.	9260.	9188.	9115.	9041.	8967.
8893.	8818.	8744.	8670.	8597.	8523.	8449.	8375.	8300.	8224.
8148.	8072.	7995.	7924.	7845.	7799.	7724.	7645.	7567.	7488.
7407.	7325.	7242.	7157.	7071.	6984.	6895.	6805.	6714.	6623.
6530.	6437.	6344.	6250.	6155.	6060.	5965.	5870.	5775.	5681.
5587.	5493.	5399.	5307.	5218.	5131.	5047.	4963.	4878.	4791.
4702.	4612.	4522.	4431.	4340.	4246.	4146.	4041.	3932.	3824.
3720.	3627.	3558.	3506.	3437.	3359.	3277.	3195.	3115.	3038.
2961.	2886.	2810.	2735.	2660.	2585.	2510.	2435.	2360.	2285.

STOR

0.	1.	4.	10.	20.	34.	50.	67.	84.	99.
114.	126.	136.	144.	151.	156.	160.	163.	165.	169.
194.	362.	770.	1261.	1578.	1671.	1677.	1678.	1678.	1675.
1671.	1666.	1660.	1654.	1647.	1640.	1632.	1625.	1617.	1609.
1602.	1594.	1586.	1578.	1571.	1563.	1555.	1548.	1540.	1532.
1524.	1516.	1508.	1501.	1493.	1484.	1474.	1464.	1454.	1443.
1432.	1422.	1411.	1399.	1388.	1376.	1364.	1353.	1341.	1328.
1316.	1304.	1291.	1279.	1266.	1254.	1241.	1229.	1216.	1203.
1191.	1178.	1166.	1154.	1142.	1131.	1119.	1108.	1097.	1085.
1074.	1062.	1050.	1038.	1025.	1013.	1000.	986.	971.	957.
943.	931.	921.	910.	897.	881.	865.	848.	832.	817.
802.	787.	771.	756.	741.	726.	711.	697.	682.	667.

STAGE

210.0	210.0	210.0	210.1	210.1	210.2	210.3	210.4	210.5	210.6
210.7	210.7	210.8	210.8	210.9	210.9	210.9	211.0	211.0	211.0
211.1	212.1	213.6	215.4	216.6	216.9	217.0	217.0	217.0	216.9
216.9	216.9	216.9	216.9	216.8	216.8	216.8	216.8	216.7	216.7
216.7	216.7	216.6	216.6	216.6	216.5	216.5	216.5	216.5	216.4
216.4	216.4	216.3	216.3	216.3	216.3	216.2	216.2	216.1	216.1
216.1	216.0	216.0	215.9	215.9	215.9	215.8	215.8	215.7	215.7
215.6	215.6	215.6	215.5	215.5	215.4	215.4	215.3	215.3	215.2
215.2	215.1	215.1	215.1	215.0	215.0	214.9	214.9	214.8	214.8
214.8	214.7	214.7	214.6	214.6	214.5	214.5	214.4	214.4	214.3
214.3	214.2	214.2	214.2	214.1	214.1	214.0	213.9	213.9	213.8
213.8	213.7	213.6	213.6	213.5	213.5	213.4	213.4	213.3	213.3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9628.	9624.	9560.	9100.	612097.
CMS	273.	273.	271.	258.	17333.
INCHES		0.50	1.99	5.68	15.90

		12.70	50.46	144.15	485.98
	AC-FT	4772.	18962.	54151.	151760.
	THOUS CU M	5886.	23389.	66794.	187193.

MAXIMUM STORAGE = 1678.

MAXIMUM STAGE IS 217.0

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SUB-AREA RUNOFF COMPUTATION

RUNOFF -- LOWER SUBBASIN

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LWRBSN		0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	429.00	0.	608.00	0.	0.	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	16.00	59.00	74.50	85.00	92.00	0.	0.

TRSPC COMPUTED BY THE PROGRAM IS 0.903

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA

TP= 19.00 CP=0.56 NTA= 0

RECESSION DATA

STRTQ= 858.00 QRCSN= -0.20 RTIOR= 1.30

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 7.10 AND R= 7.19 INTERVALS

UNIT HYDROGRAPH 42 END-OF-PERIOD ORDINATES, LAG= 19.02 HOURS, CP= 0.56 VOL= 1.00

448.	1658.	3324.	5174.	6805.	7849.	8177.	7630.	6651.	5787.
5035.	4380.	3811.	3315.	2884.	2510.	2185.	1900.	1653.	1438.
1251.	1088.	947.	824.	717.	624.	542.	472.	411.	357.
311.	270.	235.	205.	178.	155.	135.	117.	102.	89.
77.	67.								

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	3.00	1	0.02	0.	0.02	856.	1.08	15.00	61	0.	0.	0.	7218.
1.01	6.00	2	0.02	0.	0.02	814.	1.08	18.00	62	0.	0.	0.	7031.
1.01	9.00	3	0.09	0.	0.09	793.	1.08	21.00	63	0.	0.	0.	6849.
1.01	12.00	4	0.09	0.	0.09	773.	1.09	0.	64	0.	0.	0.	6672.
1.01	15.00	5	0.23	0.	0.23	753.	1.09	3.00	65	0.	0.	0.	6499.
1.01	18.00	6	0.47	0.	0.47	735.	1.09	6.00	66	0.	0.	0.	6331.
1.01	21.00	7	0.04	0.	0.04	714.	1.09	9.00	67	0.	0.	0.	6167.
1.02	0.	8	0.04	0.	0.04	696.	1.09	12.00	68	0.	0.	0.	6007.
1.02	3.00	9	0.30	0.00	0.30	679.	1.09	15.00	69	0.	0.	0.	5852.
1.02	6.00	10	0.30	0.00	0.30	667.	1.09	18.00	70	0.	0.	0.	5700.
1.02	9.00	11	1.12	0.82	0.30	1028.	1.09	21.00	71	0.	0.	0.	5553.
1.02	12.00	12	1.12	0.82	0.30	2384.	1.10	0.	72	0.	0.	0.	5409.
1.02	15.00	13	2.81	2.51	0.30	5866.	1.10	3.00	73	0.	0.	0.	5269.

1.02	18.00	14	0.71	0.41	0.30	[illegible]	1.10	6.00	74	0.	0.	0.	[illegible]	
1.02	21.00	15	0.46	0.16	0.30	27866.	1.10	9.00	75	0.	0.	0.	4995.	
1.03	0.	16	0.46	0.16	0.30	43972.	1.10	12.00	76	0.	0.	0.	4870.	
1.03	3.00	17	0.	0.	0.	59640.	1.10	15.00	77	0.	0.	0.	4744.	
1.03	6.00	18	0.	0.	0.	71437.	1.10	18.00	78	0.	0.	0.	4621.	
1.03	9.00	19	0.	0.	0.	77184.	1.10	21.00	79	0.	0.	0.	4501.	
1.03	12.00	20	0.	0.	0.	76469.	1.11	0.	80	0.	0.	0.	4385.	
1.03	15.00	21	0.	0.	0.	69916.	1.11	3.00	81	0.	0.	0.	4271.	
1.03	18.00	22	0.	0.	0.	61242.	1.11	6.00	82	0.	0.	0.	4161.	
1.03	21.00	23	0.	0.	0.	53414.	1.11	9.00	83	0.	0.	0.	4053.	
1.04	0.	24	0.	0.	0.	46522.	1.11	12.00	84	0.	0.	0.	3948.	
1.04	3.00	25	0.	0.	0.	40522.	1.11	15.00	85	0.	0.	0.	3846.	
1.04	6.00	26	0.	0.	0.	35301.	1.11	18.00	86	0.	0.	0.	3746.	
1.04	9.00	27	0.	0.	0.	30757.	1.11	21.00	87	0.	0.	0.	3649.	
1.04	12.00	28	0.	0.	0.	26803.	1.12	0.	88	0.	0.	0.	3555.	
1.04	15.00	29	0.	0.	0.	23362.	1.12	3.00	89	0.	0.	0.	3463.	
1.04	18.00	30	0.	0.	0.	20367.	1.12	6.00	90	0.	0.	0.	3373.	
1.04	21.00	31	0.	0.	0.	17760.	1.12	9.00	91	0.	0.	0.	3286.	
1.05	0.	32	0.	0.	0.	15491.	1.12	12.00	92	0.	0.	0.	3200.	
1.05	3.00	33	0.	0.	0.	15048.	1.12	15.00	93	0.	0.	0.	3118.	
1.05	6.00	34	0.	0.	0.	14658.	1.12	18.00	94	0.	0.	0.	3037.	
1.05	9.00	35	0.	0.	0.	14279.	1.12	21.00	95	0.	0.	0.	2958.	
1.05	12.00	36	0.	0.	0.	13909.	1.13	0.	96	0.	0.	0.	2882.	
1.05	15.00	37	0.	0.	0.	13549.	1.13	3.00	97	0.	0.	0.	2807.	
1.05	18.00	38	0.	0.	0.	13198.	1.13	6.00	98	0.	0.	0.	2734.	
1.05	21.00	39	0.	0.	0.	12856.	1.13	9.00	99	0.	0.	0.	2664.	
1.06	0.	40	0.	0.	0.	12523.	1.13	12.00	100	0.	0.	0.	2595.	
1.06	3.00	41	0.	0.	0.	12199.	1.13	15.00	101	0.	0.	0.	2527.	
1.06	6.00	42	0.	0.	0.	11883.	1.13	18.00	102	0.	0.	0.	2462.	
1.06	9.00	43	0.	0.	0.	11576.	1.13	21.00	103	0.	0.	0.	2398.	
1.06	12.00	44	0.	0.	0.	11276.	1.14	0.	104	0.	0.	0.	2336.	
1.06	15.00	45	0.	0.	0.	10984.	1.14	3.00	105	0.	0.	0.	2276.	
1.06	18.00	46	0.	0.	0.	10699.	1.14	6.00	106	0.	0.	0.	2217.	
1.06	21.00	47	0.	0.	0.	10422.	1.14	9.00	107	0.	0.	0.	2159.	
1.07	0.	48	0.	0.	0.	10152.	1.14	12.00	108	0.	0.	0.	2103.	
1.07	3.00	49	0.	0.	0.	9889.	1.14	15.00	109	0.	0.	0.	2049.	
1.07	6.00	50	0.	0.	0.	9633.	1.14	18.00	110	0.	0.	0.	1996.	
1.07	9.00	51	0.	0.	0.	9384.	1.14	21.00	111	0.	0.	0.	1944.	
1.07	12.00	52	0.	0.	0.	9141.	1.15	0.	112	0.	0.	0.	1894.	
1.07	15.00	53	0.	0.	0.	8904.	1.15	3.00	113	0.	0.	0.	1845.	
1.07	18.00	54	0.	0.	0.	8674.	1.15	6.00	114	0.	0.	0.	1797.	
1.07	21.00	55	0.	0.	0.	8449.	1.15	9.00	115	0.	0.	0.	1750.	
1.08	0.	56	0.	0.	0.	8230.	1.15	12.00	116	0.	0.	0.	1705.	
1.08	3.00	57	0.	0.	0.	8017.	1.15	15.00	117	0.	0.	0.	1661.	
1.08	6.00	58	0.	0.	0.	7810.	1.15	18.00	118	0.	0.	0.	1618.	
1.08	9.00	59	0.	0.	0.	7607.	1.15	21.00	119	0.	0.	0.	1576.	
1.08	12.00	60	0.	0.	0.	7410.	1.16	0.	120	0.	0.	0.	1535.	
									SUM	13.38	9.89	3.41	1352336.	
										(338.)(251.)(87.)(38293.89)				

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	77184.	75569.	64319.	36799.	1351155.
CMS	2186.	2140.	1821.	1042.	38260.
INCHES		1.64	5.58	9.58	14.65
MM		41.62	141.70	243.21	372.09
AC-FT		37472.	127574.	218969.	334997.
THOUS CU M		46221.	157361.	270095.	413213.

167.	163.	159.	155.	151.	147.	143.	139.	136.	133.
206.	477.	1173.	2843.	5573.	8794.	11928.	14287.	15437.	15294.
13983.	12248.	10683.	9304.	8104.	7060.	6151.	5361.	4672.	4073.
3552.	3098.	3010.	2932.	2856.	2782.	2710.	2640.	2571.	2505.
2440.	2377.	2315.	2255.	2197.	2140.	2084.	2030.	1978.	1927.
1877.	1828.	1781.	1735.	1690.	1646.	1603.	1562.	1521.	1482.
1444.	1406.	1370.	1334.	1300.	1266.	1233.	1201.	1170.	1140.
1111.	1082.	1054.	1026.	1000.	974.	949.	924.	900.	877.
854.	832.	811.	790.	769.	749.	730.	711.	693.	675.
657.	640.	624.	607.	592.	576.	561.	547.	533.	519.
505.	492.	480.	467.	455.	443.	432.	421.	410.	399.
389.	379.	369.	359.	350.	341.	332.	324.	315.	307.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	15437.	15114.	12864.	7360.	270231.
CMS	437.	428.	364.	208.	7652.
INCHES		0.33	1.12	1.92	2.93
MM		8.32	28.34	48.64	74.42
AC-FT		7494.	25515.	43794.	66999.
THOUS CU M		9244.	31472.	54019.	82643.

HYDROGRAPH AT STALWRBSN FOR PLAN 1, RTIO 2

176.	171.	167.	162.	158.	154.	150.	146.	143.	140.
216.	501.	1232.	2985.	5852.	9234.	12524.	15002.	16209.	16059.
14682.	12861.	11217.	9770.	8510.	7413.	6459.	5629.	4906.	4277.
3738.	3253.	3160.	3078.	2999.	2921.	2845.	2772.	2700.	2630.
2562.	2495.	2431.	2368.	2307.	2247.	2189.	2132.	2077.	2023.
1971.	1920.	1878.	1821.	1774.	1728.	1684.	1640.	1598.	1556.
1516.	1477.	1438.	1401.	1365.	1330.	1295.	1262.	1229.	1197.
1166.	1136.	1106.	1078.	1050.	1023.	996.	970.	945.	921.
897.	874.	851.	829.	808.	787.	766.	746.	727.	708.
690.	672.	655.	638.	621.	605.	589.	574.	559.	545.
531.	517.	504.	491.	478.	465.	453.	442.	430.	419.
408.	398.	387.	377.	368.	358.	349.	340.	331.	322.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16209.	15869.	13507.	7728.	283743.
CMS	459.	449.	382.	219.	8035.
INCHES		0.34	1.17	2.01	3.08
MM		8.74	29.76	51.07	78.14
AC-FT		7869.	26791.	45984.	70349.
THOUS CU M		9706.	33046.	56720.	86775.

HYDROGRAPH AT STALWRBSN FOR PLAN 1, RTIO 3

184.	179.	174.	170.	166.	161.	157.	153.	149.	147.
226.	525.	1291.	3127.	6130.	9674.	13121.	15716.	16981.	16823.
15381.	13473.	11751.	10235.	8915.	7766.	6767.	5897.	5140.	4481.
3907.	3408.	3311.	3225.	3141.	3060.	2981.	2904.	2828.	2755.
2684.	2614.	2547.	2481.	2416.	2354.	2293.	2234.	2176.	2119.
2064.	2011.	1959.	1908.	1859.	1811.	1764.	1718.	1674.	1630.
1588.	1547.	1507.	1468.	1430.	1393.	1357.	1322.	1287.	1254.
1222.	1190.	1159.	1129.	1100.	1071.	1044.	1017.	990.	965.
940.	915.	892.	869.	846.	824.	803.	782.	762.	742.
723.	704.	686.	668.	651.	634.	618.	602.	586.	571.
556.	542.	528.	514.	501.	488.	475.	463.	451.	439.
428.	417.	406.	395.	385.	375.	365.	356.	347.	338.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16981.	16625.	14150.	8096.	297254.

1068.	1043.	1013.	987.	961.	937.	912.	889.	866.	844.
821.	800.	779.	759.	740.	720.	702.	684.	666.	649.
632.	615.	600.	584.	569.	554.	540.	526.	512.	499.
486.	473.	461.	449.	438.	426.	415.	404.	394.	384.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	19296.	18692.	16880.	9200.	337789.
CMS	546.	535.	455.	261.	9565.
INCHES		0.41	1.39	2.39	3.66
MM		10.41	35.42	60.80	93.02
AC-FT		9368.	31894.	54742.	83749.
THOUS CU M		11555.	39340.	67524.	103303.

HYDROGRAPH AT STALWRUSN FOR PLAN 1, RTIO 7

418.	407.	397.	386.	376.	367.	357.	348.	340.	334.
514.	1192.	2933.	7107.	13953.	21986.	29820.	35719.	38592.	38235.
34958.	30621.	26707.	23261.	20261.	17651.	15379.	13402.	11681.	10184.
8888.	7746.	7524.	7329.	7139.	6955.	6774.	6599.	6428.	6262.
6108.	5942.	5788.	5638.	5492.	5350.	5211.	5076.	4945.	4817.
4692.	4570.	4452.	4337.	4225.	4115.	4009.	3905.	3804.	3705.
3609.	3516.	3425.	3336.	3250.	3165.	3084.	3004.	2926.	2850.
2776.	2704.	2634.	2566.	2500.	2435.	2372.	2311.	2251.	2192.
2136.	2080.	2026.	1974.	1923.	1873.	1825.	1777.	1731.	1686.
1643.	1600.	1559.	1518.	1479.	1441.	1404.	1367.	1332.	1297.
1264.	1231.	1199.	1168.	1138.	1108.	1080.	1052.	1024.	998.
972.	947.	922.	898.	875.	853.	830.	809.	788.	768.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	38592.	37784.	32159.	18399.	675578.
CMS	1093.	1070.	911.	521.	19130.
INCHES		0.82	2.79	4.79	7.32
MM		20.81	70.89	121.61	186.04
AC-FT		18736.	63787.	109485.	167499.
THOUS CU M		23111.	78680.	135047.	206606.

HYDROGRAPH AT STALWRBSN FOR PLAN 1, RTIO 8

836.	814.	793.	773.	753.	733.	714.	696.	679.	667.
1028.	2384.	5866.	14213.	27866.	43972.	59640.	71437.	77184.	76469.
69916.	61242.	53414.	46522.	40522.	35301.	30757.	26803.	23362.	20367.
17768.	15491.	15048.	14658.	14279.	13909.	13549.	13198.	12856.	12523.
12199.	11883.	11576.	11276.	10984.	10699.	10422.	10152.	9889.	9633.
9384.	9141.	8904.	8674.	8449.	8230.	8017.	7810.	7607.	7410.
7218.	7031.	6849.	6672.	6499.	6331.	6167.	6007.	5852.	5700.
5553.	5409.	5269.	5132.	4999.	4870.	4744.	4621.	4501.	4385.
4271.	4161.	4053.	3948.	3846.	3746.	3649.	3555.	3463.	3373.
3286.	3200.	3118.	3037.	2958.	2882.	2807.	2734.	2664.	2595.
2527.	2462.	2398.	2336.	2276.	2217.	2159.	2103.	2049.	1996.
1944.	1894.	1845.	1797.	1750.	1705.	1661.	1618.	1576.	1535.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	77184.	75569.	64319.	36799.	1351155.
CMS	2186.	2140.	1821.	1042.	38260.
INCHES		1.64	5.58	9.58	14.65
MM		41.62	141.70	243.21	372.09
AC-FT		37472.	127574.	218969.	334997.
THOUS CU M		46221.	157361.	270095.	413213.

COMBINE HYDROGRAPHS

COMBINED HYDROGRAPHS AT DAM -- INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT DAM PLAN 1 RTIO 1

167.	163.	160.	159.	159.	161.	163.	167.	171.	175.
253.	529.	1230.	2983.	5636.	8859.	11994.	14355.	15506.	15364.
14058.	12337.	10887.	9508.	8459.	7712.	7427.	7038.	6499.	5961.
5468.	5018.	4917.	4831.	4745.	4659.	4574.	4490.	4408.	4326.
4247.	4169.	4093.	4018.	3945.	3873.	3803.	3734.	3667.	3600.
3536.	3472.	3409.	3348.	3287.	3228.	3170.	3112.	3056.	3001.
2947.	2893.	2841.	2788.	2737.	2686.	2636.	2587.	2538.	2489.
2441.	2394.	2348.	2302.	2256.	2212.	2167.	2124.	2081.	2039.
1997.	1956.	1916.	1876.	1837.	1800.	1763.	1727.	1691.	1656.
1621.	1587.	1552.	1518.	1484.	1451.	1417.	1382.	1348.	1313.
1280.	1251.	1228.	1212.	1195.	1176.	1156.	1135.	1113.	1089.
1065.	1041.	1017.	992.	968.	944.	920.	896.	873.	849.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	15506.	15183.	12951.	8316.	390549.
CMS	439.	430.	367.	235.	11059.
INCHES		0.23	0.79	1.53	2.99
MM		5.90	20.13	38.78	75.89
AC-FT		7529.	25687.	49484.	96830.
THOUS CU M		9286.	31684.	61037.	119438.

SUM OF 2 HYDROGRAPHS AT DAM PLAN 1 RTIO 2

176.	171.	168.	167.	167.	169.	172.	175.	179.	184.
266.	556.	1291.	3048.	5918.	9302.	12594.	15073.	16281.	16132.
14761.	12954.	11348.	9988.	8906.	8137.	7896.	7411.	6834.	6262.
5734.	5261.	5163.	5073.	4982.	4892.	4803.	4715.	4628.	4543.
4459.	4377.	4297.	4219.	4142.	4067.	3993.	3921.	3850.	3780.
3712.	3645.	3580.	3515.	3452.	3389.	3328.	3268.	3209.	3151.
3094.	3038.	2983.	2928.	2874.	2821.	2768.	2716.	2664.	2614.
2564.	2514.	2465.	2417.	2369.	2322.	2276.	2230.	2185.	2141.
2097.	2054.	2012.	1970.	1929.	1889.	1851.	1813.	1776.	1739.
1702.	1666.	1630.	1594.	1558.	1523.	1488.	1452.	1415.	1378.
1342.	1307.	1274.	1247.	1225.	1209.	1192.	1173.	1153.	1132.
1189.	1086.	1062.	1038.	1013.	989.	964.	940.	915.	891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16281.	15942.	13598.	8741.	410078.
CMS	461.	451.	385.	248.	11612.
INCHES		0.24	0.83	1.60	3.14
MM		6.28	21.14	40.76	79.68
AC-FT		7905.	26972.	52010.	101672.
THOUS CU M		9751.	33270.	64154.	125411.

SUM OF 2 HYDROGRAPHS AT DAM PLAN 1 RTIO 3

184.	188.	176.	175.	175.	177.	180.	184.	188.	192.

	[illegible]	511.	1440.	2139.	11[illegible]71.
INCHES		0.28	0.95	1.84	3.[illegible]
MM		7.08	24.16	46.70	91.07
AC-FT		9034.	30828.	59590.	116201.
THOUS CU M		11144.	38026.	73503.	143332.

SUM OF 2 HYDROGRAPHS AT DA4 PLAN 1 RTIO 6

289.	284.	288.	198.	199.	201.	204.	209.	213.	219.
316.	662.	1537.	3628.	7845.	11074.	14993.	17944.	19382.	19205.
17572.	15422.	13513.	11911.	10703.	10082.	9584.	8889.	8158.	7463.
6829.	6264.	6147.	6039.	5931.	5824.	5717.	5613.	5509.	5408.
5309.	5211.	5116.	5022.	4931.	4841.	4753.	4668.	4583.	4501.
4419.	4340.	4262.	4185.	4109.	4035.	3962.	3890.	3820.	3751.
3683.	3617.	3551.	3486.	3421.	3358.	3295.	3233.	3172.	3112.
3052.	2993.	2935.	2877.	2828.	2765.	2709.	2655.	2601.	2548.
2496.	2445.	2395.	2345.	2297.	2249.	2203.	2158.	2114.	2070.
2026.	1983.	1940.	1898.	1855.	1813.	1771.	1728.	1685.	1641.
1598.	1555.	1514.	1473.	1434.	1397.	1360.	1325.	1292.	1263.
1238.	1219.	1203.	1186.	1167.	1146.	1124.	1101.	1076.	1051.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	19382.	18978.	16190.	10439.	488219.
CMS	549.	537.	458.	296.	13825.
INCHES		0.29	0.99	1.92	3.73
MM		7.38	25.17	48.68	94.87
AC-FT		9411.	32113.	62117.	121046.
THOUS CU M		11608.	39611.	76620.	149308.

SUM OF 2 HYDROGRAPHS AT DA4 PLAN 1 RTIO 7

418.	488.	480.	397.	397.	401.	409.	417.	426.	437.
632.	1323.	3075.	7257.	14098.	22148.	29986.	35888.	38764.	38410.
35146.	30865.	27181.	24631.	23134.	21735.	20095.	18280.	16492.	14989.
13671.	12516.	12269.	12045.	11823.	11604.	11389.	11178.	10970.	10767.
10567.	10372.	10181.	9994.	9811.	9632.	9457.	9285.	9116.	8951.
8788.	8628.	8472.	8318.	8166.	8017.	7871.	7727.	7587.	7449.
7313.	7178.	7046.	6921.	6808.	6698.	6582.	6463.	6343.	6223.
6103.	5986.	5869.	5754.	5641.	5529.	5419.	5310.	5203.	5097.
4993.	4898.	4798.	4691.	4593.	4499.	4407.	4316.	4228.	4140.
4053.	3964.	3881.	3799.	3711.	3626.	3542.	3456.	3369.	3282.
3195.	3110.	3027.	2947.	2869.	2793.	2720.	2650.	2582.	2517.
2453.	2390.	2328.	2266.	2205.	2145.	2086.	2027.	1968.	1910.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	38764.	37956.	32454.	21112.	979510.
CMS	1098.	1075.	919.	598.	27737.
INCHES		0.58	1.99	3.88	7.49
MM		14.75	50.45	98.45	190.33
AC-FT		18821.	64371.	125625.	242854.
THOUS CU M		23216.	79480.	154957.	299556.

SUM OF 2 HYDROGRAPHS AT DA4 PLAN 1 RTIO 8

836.	816.	801.	793.	794.	803.	817.	834.	853.	874.
1265.	2646.	6149.	14515.	28179.	44296.	59972.	71775.	77528.	76822.
70329.	62809.	56219.	52636.	49185.	44859.	40372.	36432.	32986.	29967.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21842.	20782.	20328.	19946.	19548.	19222.	18871.	18527.	18189.	17858.
17532.	17215.	16908.	16597.	16315.	16038.	15741.	15455.	15174.	14898.
14626.	14357.	14091.	13829.	13578.	13315.	13062.	12813.	12566.	12323.
12083.	11846.	11612.	11382.	11154.	10930.	10709.	10491.	10277.	10066.
9858.	9653.	9452.	9255.	9064.	8878.	8696.	8518.	8340.	8163.
7988.	7813.	7640.	7468.	7298.	7128.	6953.	6775.	6595.	6419.
6248.	6089.	5956.	5842.	5713.	5575.	5436.	5298.	5164.	5033.
4985.	4779.	4655.	4532.	4411.	4290.	4171.	4053.	3936.	3820.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	77528.	75913.	65388.	42630.	1965252.
CMS	2195.	2150.	1852.	1207.	55593.
INCHES		1.16	4.00	7.83	15.02
MM		29.58	101.64	198.80	381.48
AC-FT		37643.	129695.	253668.	486757.
THOUS CU M		46432.	159977.	312895.	600486.

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HYDROGRAPH ROUTING

ROUTED OUTFLOW - DAM - FLOOD GATE CLOSED NO[illegible] FLASHBOARDS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-186.	-1

STAGE	174.00	186.00	186.50	187.00	187.50	188.00	188.50	189.00	190.00	190.50
	190.00	191.00	192.00	193.00	193.00	194.00	195.00	195.10	195.00	
FLOW	0.	0.	254.00	720.00	1322.00	2036.00	2846.00	3741.00	5760.00	6420.00
	7571.00	8051.00	10615.00	13419.00	15020.00	16441.00	19666.00	19998.00	22382.00	
CAPACITY=	0.	518.	761.	978.	1415.	2182.				
ELEVATION=	164.	174.	186.	189.	194.	203.				

CREL	SPWID	COGW	EXPW	ELEVL	COGL	CAREA	EXPL
186.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
193.0	2.6	1.5	330.

STATION DAM, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

144.	162.	162.	160.	159.	160.	161.	164.	168.	172.
288.	484.	988.	2451.	5124.	8344.	11631.	14129.	15438.	15433.
14254.	12548.	10979.	9671.	8582.	7799.	7441.	7112.	6578.	6046.
5538.	5084.	4984.	4860.	4753.	4677.	4586.	4585.	4421.	4340.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3548.	3484.	3421.	3360.	3299.	3239.	3181.	3123.	3067.	3011.
2957.	2903.	2851.	2800.	2748.	2697.	2647.	2597.	2548.	2499.
2452.	2404.	2358.	2311.	2266.	2221.	2177.	2133.	2090.	2048.
2007.	1966.	1926.	1886.	1847.	1809.	1772.	1735.	1700.	1664.
1630.	1595.	1560.	1526.	1492.	1459.	1425.	1391.	1356.	1321.
1298.	1259.	1235.	1216.	1208.	1182.	1162.	1141.	1119.	1096.
1072.	1048.	1024.	999.	975.	951.	927.	903.	879.	856.

STORAGE

785.	788.	788.	787.	787.	787.	788.	788.	789.	789.
795.	816.	863.	958.	1069.	1190.	1293.	1366.	1402.	1402.
1369.	1328.	1273.	1232.	1196.	1178.	1158.	1146.	1126.	1106.
1086.	1067.	1068.	1058.	1054.	1051.	1047.	1043.	1040.	1037.
1033.	1030.	1027.	1024.	1021.	1018.	1015.	1012.	1009.	1006.
1003.	1000.	997.	994.	991.	988.	986.	983.	980.	978.
975.	973.	970.	968.	965.	962.	960.	957.	955.	952.
950.	947.	945.	942.	940.	938.	935.	933.	931.	929.
927.	924.	922.	919.	917.	915.	913.	911.	909.	906.
904.	902.	900.	898.	896.	894.	892.	890.	888.	886.
884.	882.	880.	879.	878.	877.	875.	874.	872.	871.
869.	867.	866.	864.	862.	861.	859.	857.	856.	854.

STAGE

186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
186.4	186.7	187.2	188.3	189.7	191.1	192.4	193.2	193.7	193.7
193.3	192.7	192.1	191.6	191.2	190.9	190.7	190.6	190.4	190.1
189.9	189.7	189.6	189.6	189.5	189.5	189.4	189.4	189.3	189.3
189.3	189.2	189.2	189.1	189.1	189.1	189.0	189.0	189.0	188.9
188.9	188.9	188.8	188.8	188.8	188.7	188.7	188.7	188.6	188.6
188.6	188.5	188.5	188.5	188.4	188.4	188.4	188.3	188.3	188.3
188.3	188.2	188.2	188.2	188.1	188.1	188.1	188.1	188.0	188.0
188.0	188.0	187.9	187.9	187.9	187.8	187.8	187.8	187.8	187.7
187.7	187.7	187.7	187.6	187.6	187.6	187.6	187.5	187.5	187.5
187.5	187.4	187.4	187.4	187.4	187.4	187.4	187.4	187.3	187.3
187.3	187.3	187.3	187.2	187.2	187.2	187.2	187.2	187.1	187.1

PEAK OUTFLOW IS 15438. AT TIME 57.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	15438.	15139.	12930.	8321.	390284.
CMS	437.	429.	366.	236.	11052.
INCHES		0.23	0.79	1.53	2.99
MM		5.88	20.18	38.88	75.84
AC-FT		7507.	25645.	49513.	96765.
THOUS CU M		9260.	31633.	61073.	119357.

STATION DAM, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

151.	170.	170.	168.	167.	168.	170.	173.	176.	180.
218.	429.	1032.	2581.	5387.	8829.	12213.	14844.	16213.	16202.
14960.	13163.	11532.	10148.	9038.	8220.	7980.	7516.	6987.	6352.
5818.	5348.	5148.	5183.	4998.	4911.	4816.	4738.	4642.	4557.
4473.	4391.	4311.	4232.	4155.	4079.	4005.	3953.	3862.	3792.
3724.	3659.	3592.	3528.	3464.	3401.	3340.	3279.	3228.	3162.
3105.	3049.	2993.	2938.	2884.	2831.	2780.	2727.	2676.	2625.
2574.	2525.	2475.	2427.	2379.	2332.	2286.	2240.	2195.	2150.

1711.	1675.	1638.	1603.	1567.	1532.	1496.	1460.	1424.	1387.
1451.	1316.	1284.	1254.	1231.	1213.	1197.	1179.	1159.	1138.
1116.	1093.	1069.	1045.	1020.	996.	971.	947.	922.	898.

STORAGE

786.	789.	789.	789.	788.	789.	789.	789.	790.	791.
797.	818.	866.	956.	1080.	1204.	1310.	1386.	1423.	1422.
1389.	1338.	1290.	1247.	1211.	1181.	1174.	1160.	1138.	1118.
1097.	1078.	1078.	1068.	1063.	1060.	1056.	1053.	1049.	1046.
1042.	1039.	1035.	1032.	1029.	1026.	1023.	1020.	1017.	1014.
1011.	1008.	1005.	1002.	999.	996.	993.	990.	987.	985.
982.	979.	977.	974.	972.	969.	967.	964.	961.	959.
956.	953.	951.	948.	946.	943.	941.	939.	936.	934.
932.	930.	927.	925.	923.	920.	918.	916.	913.	911.
909.	907.	905.	903.	901.	899.	897.	894.	892.	890.
888.	886.	884.	882.	880.	879.	878.	876.	875.	874.
872.	870.	869.	867.	865.	864.	862.	860.	859.	857.

STAGE

186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.4
186.4	186.7	187.3	188.3	189.8	191.3	192.6	193.5	193.9	193.9
193.5	192.9	192.3	191.8	191.4	191.1	190.9	190.8	190.5	190.3
190.0	189.8	189.7	189.7	189.6	189.6	189.5	189.5	189.4	189.4
189.4	189.3	189.3	189.2	189.2	189.2	189.1	189.1	189.1	189.0
189.0	189.0	188.9	188.9	188.8	188.8	188.8	188.8	188.7	188.7
188.6	188.6	188.6	188.6	188.5	188.5	188.5	188.4	188.4	188.4
188.3	188.3	188.3	188.2	188.2	188.2	188.2	188.1	188.1	188.1
188.0	188.0	188.0	188.0	187.9	187.9	187.9	187.9	187.8	187.8
187.8	187.7	187.7	187.7	187.7	187.6	187.6	187.6	187.6	187.5
187.5	187.5	187.5	187.4	187.4	187.4	187.4	187.4	187.4	187.3
187.3	187.3	187.3	187.3	187.2	187.2	187.2	187.2	187.2	187.1

PEAK OUTFLOW IS 16213. AT TIME 57.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16213.	15894.	13577.	8746.	409806.
CMS	459.	450.	384.	248.	11604.
INCHES		0.24	0.83	1.61	3.13
MM		6.18	21.10	40.79	79.63
AC-FT		7881.	26929.	52041.	101605.
THOUS CU M		9722.	33217.	64192.	125328.

STATION DAM, PLAN 1, RATIO 5

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

158.	178.	178.	176.	175.	175.	178.	181.	185.	189.
229.	454.	1084.	2718.	5651.	9264.	12795.	15559.	17818.	16956.
15655.	13797.	12072.	10632.	9492.	8685.	8343.	7892.	7245.	6657.
6086.	5591.	5396.	5345.	5228.	5144.	5045.	4955.	4863.	4774.
4686.	4600.	4516.	4433.	4352.	4273.	4196.	4120.	4046.	3973.
3901.	3831.	3762.	3694.	3629.	3563.	3499.	3436.	3374.	3313.
3253.	3194.	3136.	3078.	3022.	2966.	2918.	2856.	2803.	2749.
2697.	2645.	2593.	2543.	2493.	2443.	2394.	2346.	2299.	2252.
2206.	2161.	2117.	2073.	2030.	1990.	1949.	1909.	1870.	1831.
1793.	1754.	1717.	1679.	1642.	1605.	1567.	1530.	1492.	1453.
1415.	1377.	1341.	1307.	1276.	1248.	1227.	1210.	1193.	1174.
1154.	1133.	1111.	1087.	1064.	1039.	1015.	990.	969.	948.

STAGE

186.4	186.4	186.4	186.4	186.4	186.4	186.4	186.4	186.4	186.4
186.5	186.8	187.4	188.6	190.3	192.0	193.4	194.3	194.7	194.7
194.3	193.7	193.1	192.5	192.1	191.8	191.6	191.4	191.1	190.8
190.5	190.3	190.2	190.1	190.1	190.0	190.0	189.9	189.9	189.8
189.8	189.7	189.7	189.6	189.6	189.6	189.5	189.5	189.4	189.4
189.3	189.3	189.3	189.2	189.2	189.2	189.1	189.1	189.0	189.0
189.0	188.9	188.9	188.9	188.8	188.8	188.8	188.7	188.7	188.7
188.6	188.6	188.6	188.5	188.5	188.5	188.4	188.4	188.4	188.3
188.3	188.3	188.2	188.2	188.2	188.1	188.1	188.1	188.1	188.0
188.0	188.0	187.9	187.9	187.9	187.9	187.8	187.8	187.8	187.7
187.7	187.7	187.6	187.6	187.6	187.6	187.5	187.5	187.5	187.5
187.4	187.4	187.4	187.4	187.4	187.4	187.3	187.3	187.3	187.3

PEAK OUTFLOW IS 19331. AT TIME 57.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	19331.	18919.	16167.	10445.	487923.
CMS	547.	536.	458.	296.	13816.
INCHES		0.29	0.99	1.92	3.73
MM		7.35	25.13	48.71	94.81
AC-FT		9381.	32068.	62153.	120973.
THOUS CU M		11571.	39555.	76664.	149217.

STATION . DAM, PLAN 1, RATIO 7

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

396.	416.	403.	398.	397.	400.	406.	414.	423.	433.
551.	1088.	2607.	6413.	13170.	21554.	29559.	35611.	38697.	38499.
35402.	31185.	27398.	24754.	23211.	21841.	20219.	18360.	16628.	15161.
13884.	12654.	12232.	12111.	11826.	11645.	11406.	11208.	10992.	10793.
10598.	10408.	10285.	10028.	9835.	9656.	9480.	9308.	9138.	8972.
8809.	8649.	8492.	8338.	8186.	8037.	7892.	7747.	7607.	7470.
7333.	7198.	7066.	6939.	6824.	6715.	6600.	6481.	6361.	6241.
6122.	6004.	5887.	5772.	5661.	5548.	5438.	5328.	5221.	5115.
5010.	4908.	4806.	4707.	4610.	4515.	4422.	4331.	4242.	4155.
4067.	3981.	3895.	3809.	3725.	3643.	3558.	3473.	3386.	3298.
3212.	3126.	3043.	2962.	2883.	2809.	2736.	2665.	2597.	2531.
2466.	2403.	2341.	2279.	2218.	2158.	2098.	2039.	1983.	1924.

STORAGE

816.	817.	816.	816.	816.	816.	816.	817.	818.	819.
829.	878.	958.	1128.	1339.	1526.	1653.	1740.	1783.	1780.
1737.	1676.	1620.	1579.	1554.	1531.	1503.	1468.	1432.	1395.
1357.	1323.	1311.	1307.	1299.	1293.	1286.	1280.	1274.	1268.
1262.	1256.	1249.	1243.	1237.	1231.	1226.	1220.	1214.	1209.
1204.	1198.	1193.	1188.	1183.	1178.	1173.	1168.	1163.	1159.
1154.	1149.	1144.	1139.	1135.	1131.	1127.	1123.	1118.	1114.
1109.	1105.	1100.	1096.	1091.	1087.	1082.	1078.	1073.	1069.
1064.	1060.	1056.	1052.	1048.	1044.	1040.	1036.	1033.	1029.
1025.	1022.	1018.	1015.	1011.	1007.	1003.	999.	995.	991.
987.	983.	979.	975.	972.	968.	964.	961.	957.	954.
950.	947.	944.	941.	938.	934.	931.	928.	925.	922.

STAGE

193.1	192.7	192.6	192.5	192.4	192.4	192.3	192.2	192.1	192.1
192.8	191.9	191.8	191.8	191.7	191.6	191.6	191.5	191.4	191.4
191.3	191.2	191.2	191.1	191.1	191.0	190.9	190.9	190.8	190.8
190.7	190.6	190.6	190.5	190.5	190.4	190.4	190.3	190.3	190.2
190.2	190.1	190.1	190.0	190.0	189.9	189.8	189.8	189.7	189.7
189.6	189.6	189.5	189.5	189.4	189.4	189.3	189.3	189.2	189.2
189.2	189.1	189.1	189.0	189.0	188.9	188.9	188.9	188.8	188.8
188.7	188.7	188.6	188.6	188.5	188.5	188.4	188.4	188.3	188.3
188.3	188.2	188.2	188.2	188.1	188.1	188.0	188.0	188.0	187.9

PEAK OUTFLOW IS 38697. AT TIME 57.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	38697.	37876.	32427.	21123.	979100.
CMS	1096.	1073.	918.	598.	27725.
INCHES		0.58	1.98	3.88	7.49
MM		14.72	50.41	98.50	190.25
AC-FT		18781.	64318.	125690.	242752.
THOUS CU M		23167.	79335.	155037.	299430.

STATION DAM, PLAN 1, RATIO 8

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

898.	806.	809.	794.	794.	880.	813.	829.	848.	868.
1126.	2249.	5405.	13175.	27265.	45379.	59285.	71331.	77421.	76969.
70737.	62368.	56428.	52787.	49378.	45107.	40603.	36636.	33174.	30135.
27478.	25145.	24458.	24145.	23592.	23234.	22739.	22363.	21911.	21530.
21112.	20737.	20342.	19978.	19604.	19252.	18896.	18555.	18215.	17885.
17558.	17248.	16926.	16623.	16340.	16058.	15771.	15488.	15205.	14929.
14656.	14387.	14121.	13859.	13608.	13345.	13093.	12843.	12596.	12352.
12112.	11875.	11641.	11409.	11182.	10957.	10735.	10520.	10305.	10094.
9885.	9680.	9479.	9281.	9089.	8902.	8720.	8541.	8363.	8187.
8011.	7838.	7664.	7494.	7324.	7153.	6979.	6801.	6622.	6445.
6275.	6112.	5975.	5859.	5735.	5599.	5459.	5322.	5186.	5055.
4927.	4801.	4676.	4553.	4431.	4310.	4191.	4073.	3956.	3840.

STORAGE

857.	851.	851.	850.	850.	850.	851.	852.	853.	855.
873.	939.	981.	1339.	1618.	1845.	2044.	2184.	2253.	2248.
2178.	2081.	2019.	1965.	1922.	1868.	1808.	1754.	1706.	1661.
1621.	1585.	1574.	1569.	1560.	1554.	1546.	1540.	1532.	1526.
1519.	1512.	1505.	1498.	1491.	1485.	1478.	1471.	1465.	1458.
1452.	1445.	1438.	1432.	1426.	1419.	1412.	1404.	1396.	1388.
1381.	1373.	1366.	1358.	1351.	1344.	1336.	1329.	1322.	1314.
1307.	1300.	1293.	1286.	1279.	1273.	1266.	1259.	1252.	1246.
1239.	1232.	1226.	1219.	1213.	1207.	1201.	1195.	1189.	1183.
1178.	1172.	1165.	1159.	1153.	1147.	1141.	1134.	1128.	1121.
1115.	1109.	1104.	1099.	1094.	1089.	1083.	1077.	1072.	1066.
1061.	1056.	1050.	1045.	1040.	1035.	1030.	1026.	1021.	1016.

STAGE

187.1	187.1	187.1	187.1	187.1	187.1	187.1	187.1	187.1	187.1
187.3	188.1	189.8	192.9	196.3	199.0	201.3	203.0	203.8	203.8
202.9	201.8	200.9	200.4	199.9	199.2	198.5	197.9	197.3	196.8
196.3	195.9	195.7	195.7	195.6	195.5	195.4	195.3	195.2	195.2

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
194.3	194.2	194.1	194.0	193.8	193.9	193.8	193.7	193.6	193.5
193.4	193.3	193.2	193.1	193.1	193.0	192.9	192.8	192.7	192.6
192.5	192.4	192.4	192.3	192.2	192.1	192.0	192.0	191.9	191.8
191.7	191.6	191.6	191.5	191.4	191.3	191.3	191.2	191.1	191.1
191.0	190.9	190.8	190.8	190.7	190.6	190.5	190.5	190.4	190.3
190.2	190.2	190.1	190.0	190.0	189.9	189.9	189.8	189.7	189.7
189.6	189.5	189.5	189.4	189.3	189.3	189.2	189.2	189.1	189.0

PEAK OUTFLOW IS 77421. AT TIME 57.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	77421.	75785.	65328.	42645.	1962628.
CMS	2192.	2146.	1850.	1208.	55575.
INCHES		1.16	4.00	7.85	15.01
MM		29.45	101.55	198.87	381.36
AC-FT		37579.	129576.	253755.	486602.
THOUS CU M		46354.	159829.	313082.	600215.

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS							
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8
				0.20	0.21	0.22	0.23	0.24	0.25	0.50	1.00
HYDROGRAPH AT	LKFLWR	179.00	1	1928.	2024.	2120.	2217.	2313.	2410.	4819.	9638.
	(........)		(	54.58)(	57.31)(	60.04)(	62.77)(	65.50)(	68.23)(	136.46)(	272.92)(
ROUTED TO	SARRIV	179.00	1	1912.	2008.	2104.	2199.	2295.	2391.	4811.	9628.
	(........)		(	54.14)(	56.85)(	59.57)(	62.28)(	65.00)(	67.71)(	136.22)(	272.64)(
HYDROGRAPH AT	LWRBSN	429.00	1	15437.	16209.	16981.	17752.	18524.	19296.	38592.	77184.
	(........)		(	437.12)(	458.98)(	480.84)(	502.69)(	524.55)(	546.41)(	1092.81)(	2185.62)(
2 COMBINED	DAM	608.00	1	15506.	16281.	17056.	17831.	18607.	19382.	38764.	77528.
	(........)		(	439.07)(	461.02)(	482.97)(	504.93)(	526.88)(	548.83)(	1097.67)(	2195.34)(
ROUTED TO	DAM	608.00	1	15438.	16213.	17010.	17798.	18569.	19351.	38697.	77421.
	(........)		(	437.15)(	459.09)(	481.66)(	503.99)(	525.81)(	547.39)(	1095.78)(	2192.31)(

PLAN 1 STATION SARRIV

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1912.	213.0	96.00
0.21	2008.	213.0	96.00
0.22	2104.	213.1	96.00
0.23	2199.	213.2	96.00
0.24	2295.	213.3	96.00
0.25	2391.	213.3	96.00
0.50	4811.	214.8	87.00
1.00	9628.	217.0	84.00

SUMMARY OF DAM SPLIT ANALYSIS

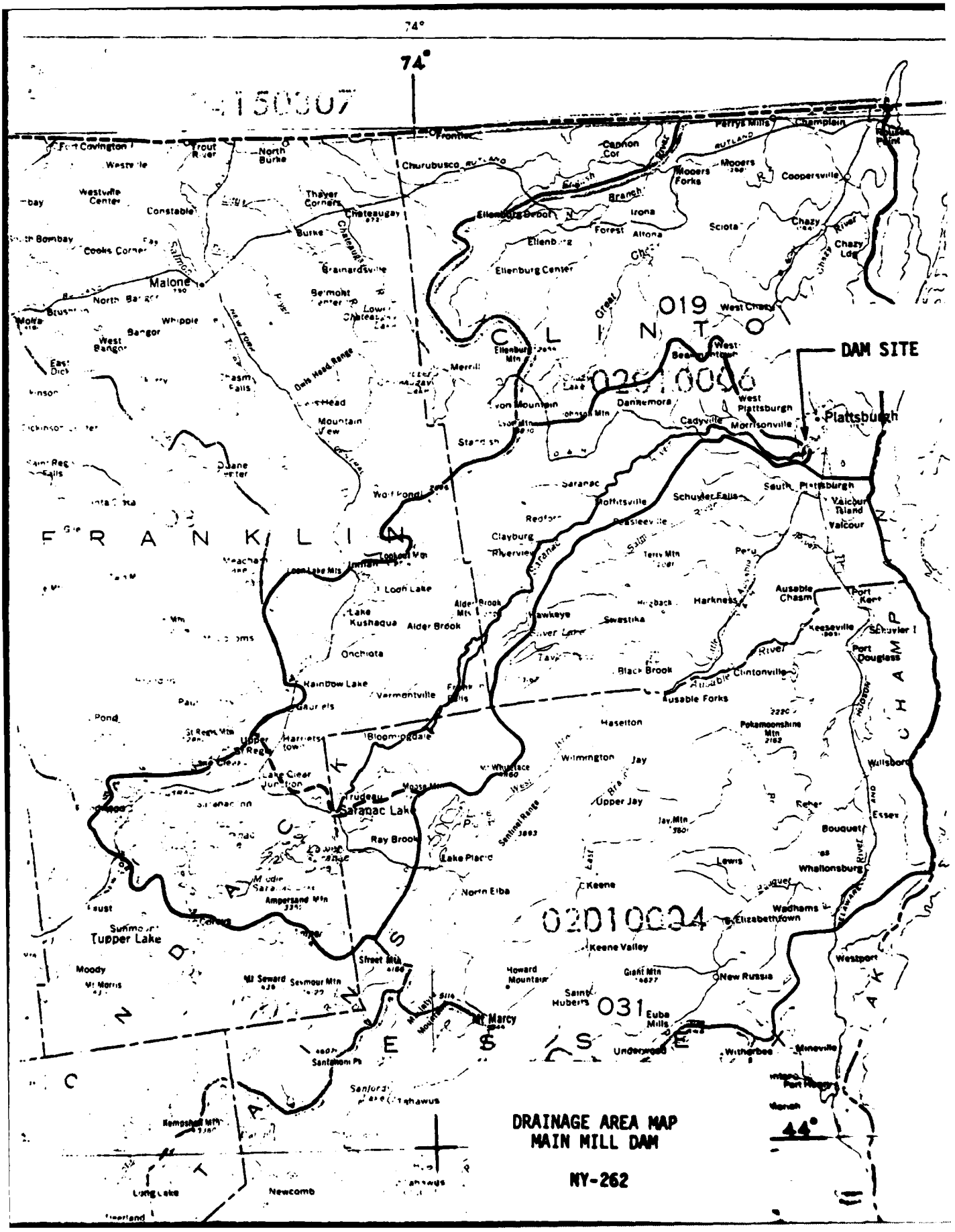
PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM — [@ LEFT EMBANKMENT]
ELEVATION	186.00	186.00	193.80
STORAGE	761.	761.	1413.
OUTFLOW	0.	0.	15820.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	193.67	0.	1402.	15438.	0.	57.00	0.
0.21	193.92	0.12	1423.	16213.	6.00	57.00	0.
0.22	194.13	0.33	1440.	17010.	6.00	57.00	0.
0.23	194.32	0.52	1456.	17798.	12.00	57.00	0.
0.24	194.50	0.70	1472.	18569.	12.00	57.00	0.
0.25	194.68	0.88	1486.	19331.	12.00	57.00	0.
0.50	198.22	4.42	1783.	38697.	42.00	57.00	0.
1.00	203.85	10.05	2253.	77421.	126.00	57.00	0.

NO FLASHBOARDS
FLOOD GATE CLOSED

MAIN MILL DAM
NY-260


74°
DAM SITE
DRAINAGE AREA MAP
MAIN MILL DAM
NY-262
44°

AD-A110 162 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MAIN MILL DAM (INVENTORY NUMBER N.--ETC(U)
SEP 81 G KOCH DACW51-79-C-0001

UNCLASSIFIED NL

END
DATE FILMED
2 82
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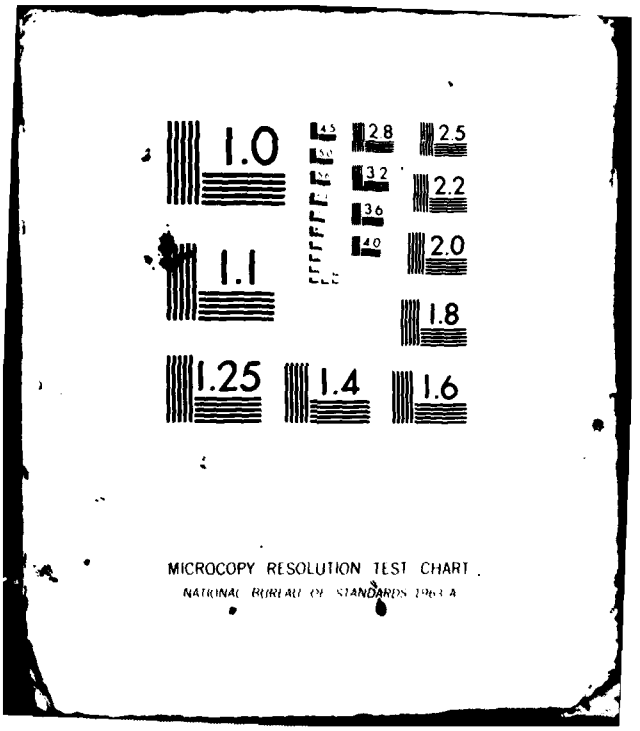
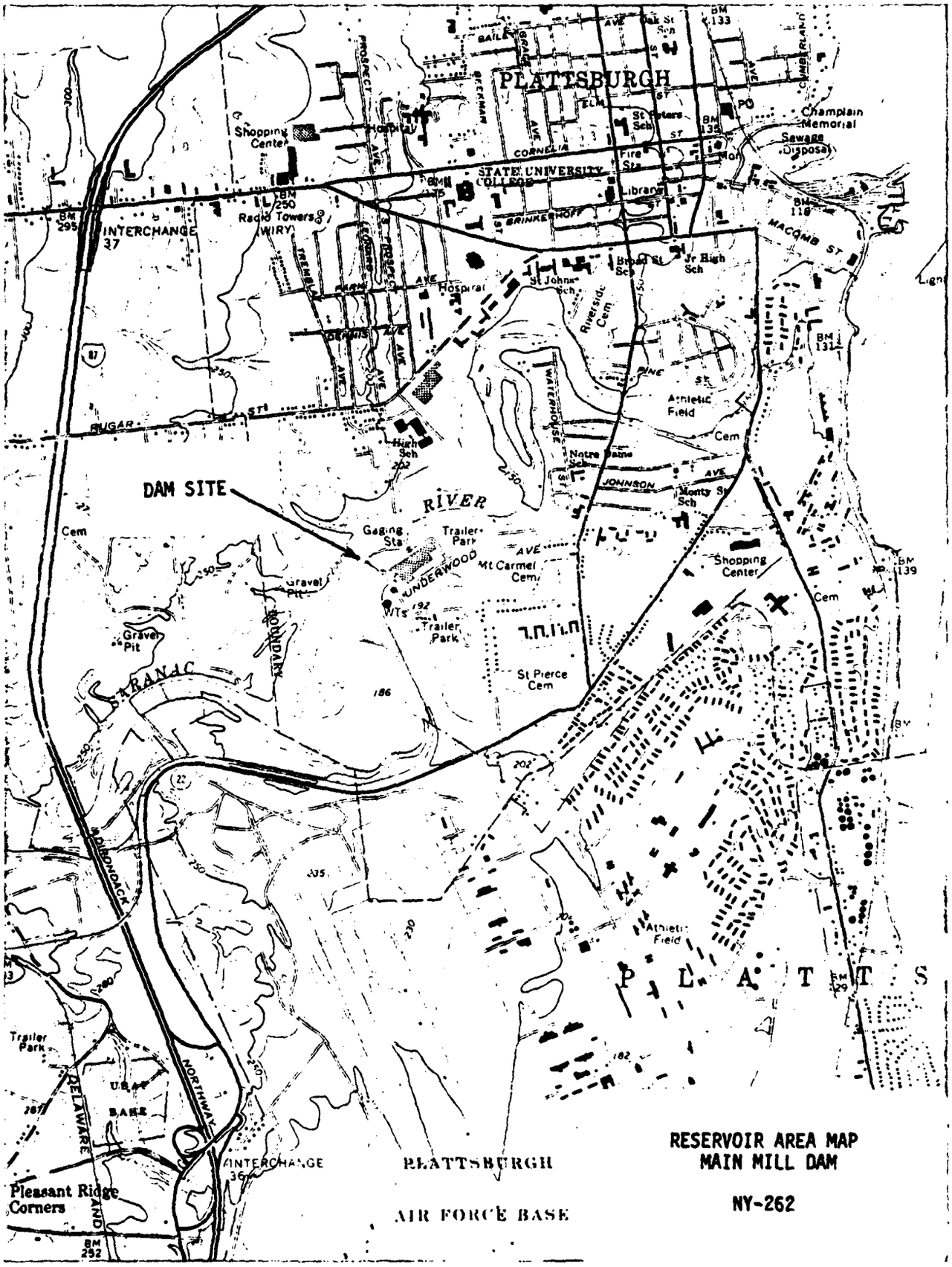
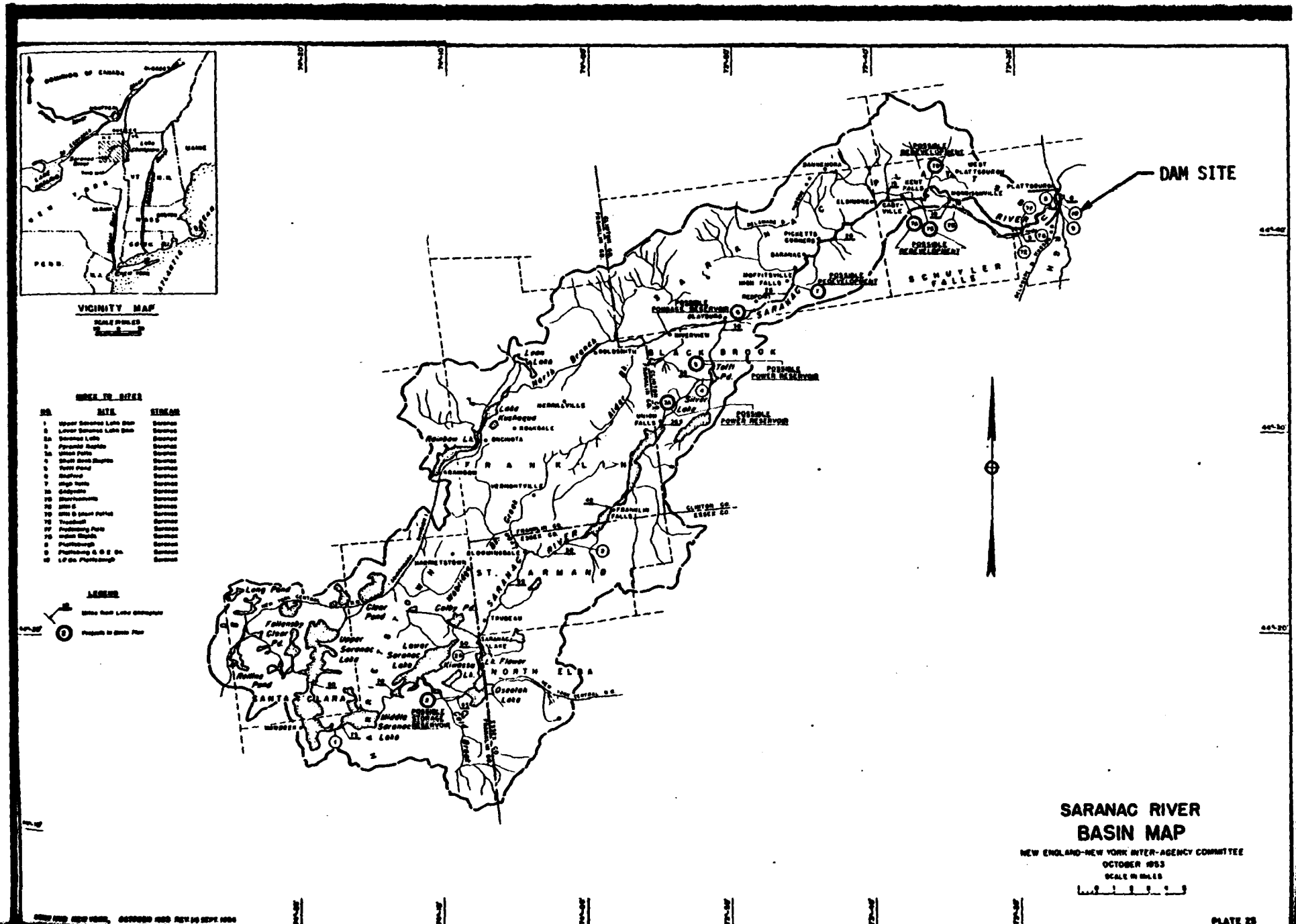
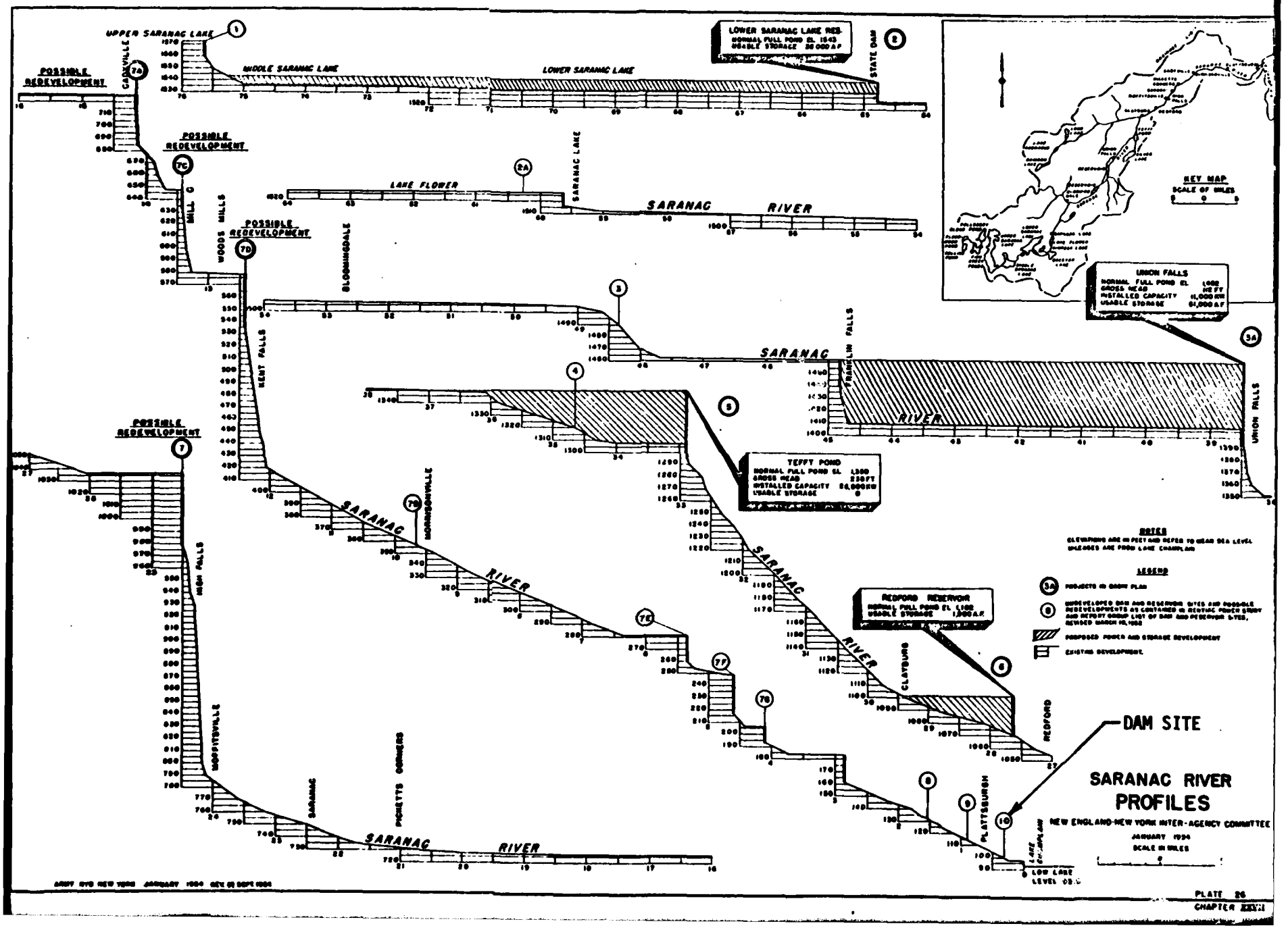

1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A


PLATTSBURGH
DAM SITE
SAR. RIVER
INTERCHANGE 37
INTERCHANGE 36
PLATTSBURGH AIR FORCE BASE
Pleasant Ridge Corners
RESERVOIR AREA MAP
MAIN MILL DAM
NY-262


DAM SITE
VICINITY MAP
INDEX TO SITES
SITE
STREAM
LEGEND
SARANAC RIVER
BASIN MAP
NEW ENGLAND-NEW YORK INTER-AGENCY COMMITTEE
OCTOBER 1953
SCALE IN MILES
PLATE 23
CHAPTER XXXII


UPPER SARANAC LAKE
MIDDLE SARANAC LAKE
LOWER SARANAC LAKE
LOWER SARANAC LAKE RES.
NORMAL FULL POND EL. 1543
USABLE STORAGE 50,000 A.F.
STATE DAM
POSSIBLE REDEVELOPMENT
CADYVILLE
LAKE FLOWER
SARANAC LAKE
SARANAC RIVER
MILL C
WOODS MILLS
BLOOMINGDALE
KENT FALLS
FRANKLIN FALLS
UNION FALLS
UNION FALLS
NORMAL FULL POND EL. 1,000
GROSS HEAD 140 FT
INSTALLED CAPACITY 11,000 KW
USABLE STORAGE 51,000 A.F.
TEFFT POND
NORMAL FULL POND EL. 1,350
GROSS HEAD 230FT
INSTALLED CAPACITY 50,000KW
USABLE STORAGE 0
REDFORD RESERVOIR
NORMAL FULL POND EL. 1,100
USABLE STORAGE 1,000 A.F.
KEY MAP
SCALE OF MILES
NOTES
ELEVATIONS ARE IN FEET AND REFER TO MEAN SEA LEVEL UNLESS ARE FROM LAKE CHAMPLAIN
LEGEND
PROJECTS IN GROUP PLAN
REDEVELOPED DAM AND RESERVOIR SITES AND POSSIBLE REDEVELOPMENTS AS CONTAINED IN HEATING POWER STUDY AND REPORT GROUP LIST OF DAM AND RESERVOIR SITES, REVISED MARCH 15, 1955
PROPOSED POWER AND STORAGE DEVELOPMENT
EXISTING DEVELOPMENT
HIGH FALLS
MORRISONVILLE
SARANAC
PORETTS CORNERS
PLATTSBURGH
CLAYBURG
REDFORD
DAM SITE
SARANAC RIVER PROFILES
NEW ENGLAND-NEW YORK INTER-AGENCY COMMITTEE
JANUARY 1956
SCALE IN MILES
LOW LAKE LEVEL
PLATE 26
CHAPTER XXVII

04273500 SARANAC RIVER AT PLATTSBURGH, NY

LOCATION.--Lat 44°40'54", long 73°28'18", Clinton County, Hydrologic Unit 02010006, on right bank at Plattsburgh, 600 ft (183 m) downstream from Imperial Paper and Color Corp. dam, 3.0 mi (4.8 km) upstream from mouth, and 5.5 mi (8.8 km) downstream from Mead Brook.

DRAINAGE AREA.--608 mi² (1,575 km²). Prior to Nov. 12, 1919, 607 mi² (1,572 km²).

PERIOD OF RECORD.--March 1903 to September 1930, October 1943 to current year. Published as "near Plattsburgh," 1903-30.

REVISED RECORDS.--WSP 345: Drainage area. WSP 384: 1909-10 (monthly discharge only). WSP 1387: 1907-8. WSP 1437: 1908 (minimum daily only).

GAGE.--Water-stage recorder. Datum of gage is 155.74 ft (47.470 m) National Geodetic Vertical Datum of 1929. Prior to Nov. 12, 1919, nonrecording gage and Nov. 12, 1919 to Sept. 30, 1930, water-stage recorder, at site 1.5 mi (2.4 km) upstream at different datum.

REMARKS.--Records good except those for winter periods, which are fair. Considerable diurnal fluctuation caused by power and industrial operations. Slight regulation by storage in Upper and Lower Saranac Lakes and elsewhere. During year, city of Plattsburgh diverted an average of 3.43 ft³/s (0.097 m³/s) from Saranac River and Mead and West Brooks, tributaries above station, for municipal supply. About 1 ft³/s (0.028 m³/s) diverted from Great Chazy River basin into Saranac River for water supply of State Institutions at Dannemora.

AVERAGE DISCHARGE.--63 years, 835 ft³/s (23.65 m³/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft³/s (326 m³/s) Apr. 8, 1928, from computation of flow over dam and through waste gates and powerplant; minimum daily, 3.6 ft³/s (0.102 m³/s) June 26, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,930 ft³/s (168 m³/s) Apr. 3, gage height, 7.92 ft (2.414 m); minimum gage height, 0.64 ft (0.195 m) June 24; minimum daily discharge, 3.6 ft³/s (0.102 m³/s) June 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	248	582	375	582	593	549	3470	2540	1230	89	291	599
2	393	529	346	697	681	616	3140	2210	1180	89	246	534
3	397	523	291	1240	588	599	4060	1990	999	124	397	472
4	443	513	149	1080	561	593	3700	2040	888	112	463	477
5	425	513	221	946	427	724	3160	1990	762	142	371	488
6	388	588	261	849	548	1050	2730	1880	795	96	367	498
7	448	513	383	849	548	1940	2410	1680	717	184	448	1480
8	480	518	503	864	560	1650	2180	1580	711	69	338	1430
9	470	523	463	893	580	1560	1940	1440	693	89	268	1240
10	450	518	468	858	620	1550	1850	1380	681	67	313	976
11	360	443	503	856	680	1540	1730	1300	693	80	290	968
12	331	415	472	781	660	1340	1720	1250	687	58	295	856
13	415	477	492	768	580	1130	1730	1260	633	91	534	795
14	566	622	588	730	700	1120	1940	1240	582	64	397	768
15	821	711	518	864	548	1140	2190	1170	548	57	284	1020
16	991	582	518	893	580	1170	2350	1130	483	42	295	1040
17	871	705	503	828	480	1110	2630	1030	313	221	384	953
18	922	835	468	762	470	991	2460	885	402	487	331	907
19	1010	740	453	878	480	1020	2330	760	489	411	291	835
20	888	539	395	856	411	1080	2210	717	137	363	395	795
21	717	523	331	762	518	1150	2130	724	41	395	293	785
22	828	518	346	775	448	1400	2140	705	48	295	327	740
23	984	487	534	888	477	1060	2150	616	72	233	298	711
24	622	663	487	762	563	2980	2190	669	84	198	395	693
25	472	539	500	687	488	4180	2060	762	5.1	204	388	693
26	448	482	539	762	534	4390	2050	1080	3.6	295	900	693
27	327	472	518	775	539	3480	2160	1010	47	248	593	683
28	327	295	518	784	548	2620	3160	1110	82	375	888	877
29	402	230	513	795	----	2900	3380	1140	62	367	687	840
30	399	367	550	784	----	2060	2930	1260	60	258	534	880
31	610	----	518	663	----	2440	----	1340	----	309	593	----
TOTAL	17695	15084	13741	25228	19183	50918	75070	39896	13771.7	5898	12236	23660
MEAN	570	528	443	814	642	1630	2502	1277	489	190	395	789
MAX	1010	835	550	1240	700	4390	4060	2540	1230	487	888	1480
MIN	248	230	149	562	411	549	1720	616	3.6	42	248	488

CAL YR 1978 TOTAL 348636.0 MEAN 955 MAX 4710 MIN 70
WTR YR 1979 TOTAL 308410.7 MEAN 845 MAX 4060 MIN 3.6

APPENDIX D

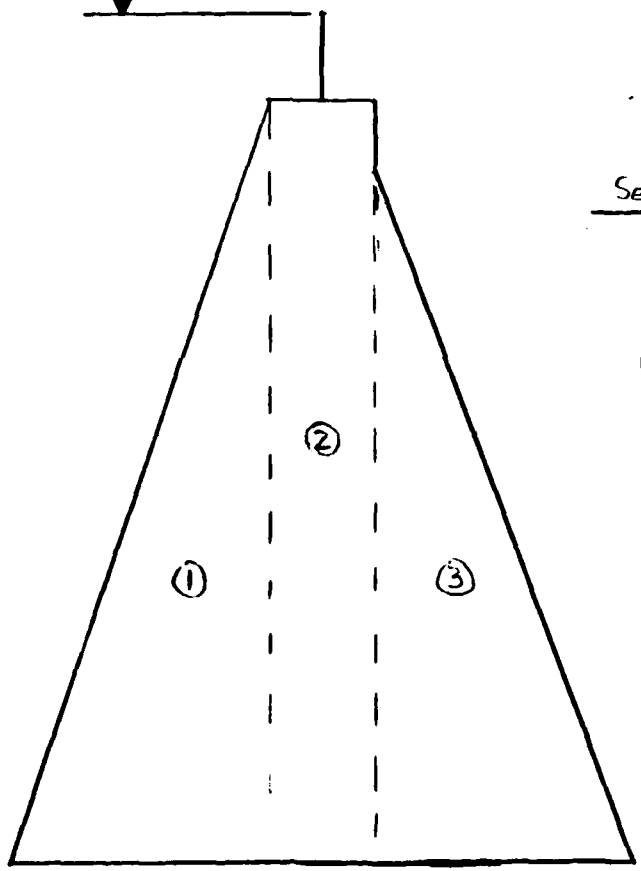
STABILITY COMPUTATIONS

MAIN MILL DAM

APPROXIMATE CROSS SECTION OF SPILLWAY PORTION

SCALE 1" = 5'

(BASED ON SKETCH FROM CONSERVATION COMMISSION REPORT)



SEGMENT	AREA (ft^2)	DISTANCE FROM CENTROID TO DOWNSTREAM TOE (ft)
①	$\frac{1}{2}(7.5)(22) = 82.5$	13
②	$(3)(22) = 66$	9
③	$\frac{1}{2}(7.5)(20) = 75$	5

STRUCTURAL STABILITY ANALYSIS

This analysis was based on an approximate cross section of the spillway section shown on a 1913 Conservation Commission inspection report. A normal analysis was performed including both overturning and sliding analyses. Since the foundation conditions were unknown, full uplift was assumed at the upstream toe, decreasing to the tailwater pressure at the downstream toe.

ANALYSIS CONDITIONS

1. Normal conditions; 2.5 feet of flashboards in place; water surface at top of flashboards

2. Water surface at spillway crest (no flashboards) with an ice load of 5,000 pounds per linear foot

3. Flood flows; water surface at top of embankment section; 7.8 feet above spillway crest

4. Normal condition as in case No. 1, with a seismic coefficient of 0.10.

W.S. Top of Dam

STABILITY ANALYSIS PROGRAM - WORK SHEET

INPUT ENTRY		ANALYSIS CONDITION 1	2	3	4	5
Unit Weight of Dam (K/ft^3)	0	0.15	0.15	0.15	0.15	
Area of Segment No. 1 (ft^2)	1	82.5	82.5	82.5	82.5	
Distance from Center of Gravity of Segment No. 1 to Downstream Toe (ft)	2	13	13	13	13	
Area of Segment No. 2 (ft^2)	3	66	66	66	66	
Distance from Center of Gravity of Segment No. 2 to Downstream Toe (ft)	4	9	9	9	9	
Area of Segment No. 3 (ft^2)	5	75	75	75	75	
Distance from Center of Gravity of Segment No. 3 to Downstream Toe (ft)	6	5	5	5	5	
Base Width of Dam (Total) (ft)	7	18	18	18	18	
Height of Dam (ft)	8	22	22	22	22	
Ice Loading (K/L ft.)	9	—	5	—	—	
Coefficient of Sliding	10	0.65	0.65	0.65	0.65	
Unit Weight of Soil (K/ft^3) (deduct 10)	11	0.055	.055	.055	.055	
Active Soil Coefficient - Ka	12	—	—	—	—	
Passive Soil Coefficient - Kp	13	—	—	—	—	
Height of Water over Top of Dam or Spillway (ft)	14	—	—	5.3	—	
Height of Soil for Active Pressure (ft)	15	—	—	—	—	
Height of Soil for Passive Pressure (ft)	16	—	—	—	—	
Height of Water in Tailrace Channel (ft)	17	2	2	2	2	
Weight of Water (K/ft^3)	18	0.0624	0.0624	0.0624	0.0624	
Area of Segment No. 4 (ft^2)	19	—	—	—	—	
Distance from Center of Gravity of Segment No. 4 to Downstream Toe (ft)	20	—	—	—	—	
Height of Ice Load or Active Water (ft) (does not include 14)	46	24.5	22	24.5	24.5	
Seismic Coefficient (g)	50	—	—	—	0.1	
RESULTS OF ANALYSIS						
Factor of Safety vs. Overturning		0.94	0.81	0.76	0.88	
Distance From Toe to Resultant		-0.99	-3.46	-5.28	-2.10	
Factor of Safety vs. Sliding		0.65	0.65	0.47	0.51	

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

1) H.W. King and E. F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963

2) The Resources of the New England-New York Region; Part 2 - Chapter 27; Lake Champlain Drainage Basin, NY-VT; by New England- New York Inter-Agency Committee, 1954

3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

U. S. Army Corps of Engineers:

4) HEC-1 Flood Hydrograph Package - Dam Safety Version, September 1978

5) Engineering Manual 1110-2-1405; Flood-Hydrograph Analyses and Computations, August 1959.

U.S. Army Corps of Engineers; New York District:

6) Phase I Inspection Report - Lake Flower Dam; by Dale Engineering Co., September 1980.

7) Upper Hudson and Mohawk River Basins Hydrologic Flood Routing Models, Resource Analysis, Inc., October 1976.

8) U.S. Department of Agriculture, Soil Conservation Service; National Engineering Handbook; Section 4 - Hydrology, August 1972.

9) U.S. Department of Commerce; Weather Bureau: Hydrometeorological Report No. 33: Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6,12,24, and 48 Hours, April 1956.

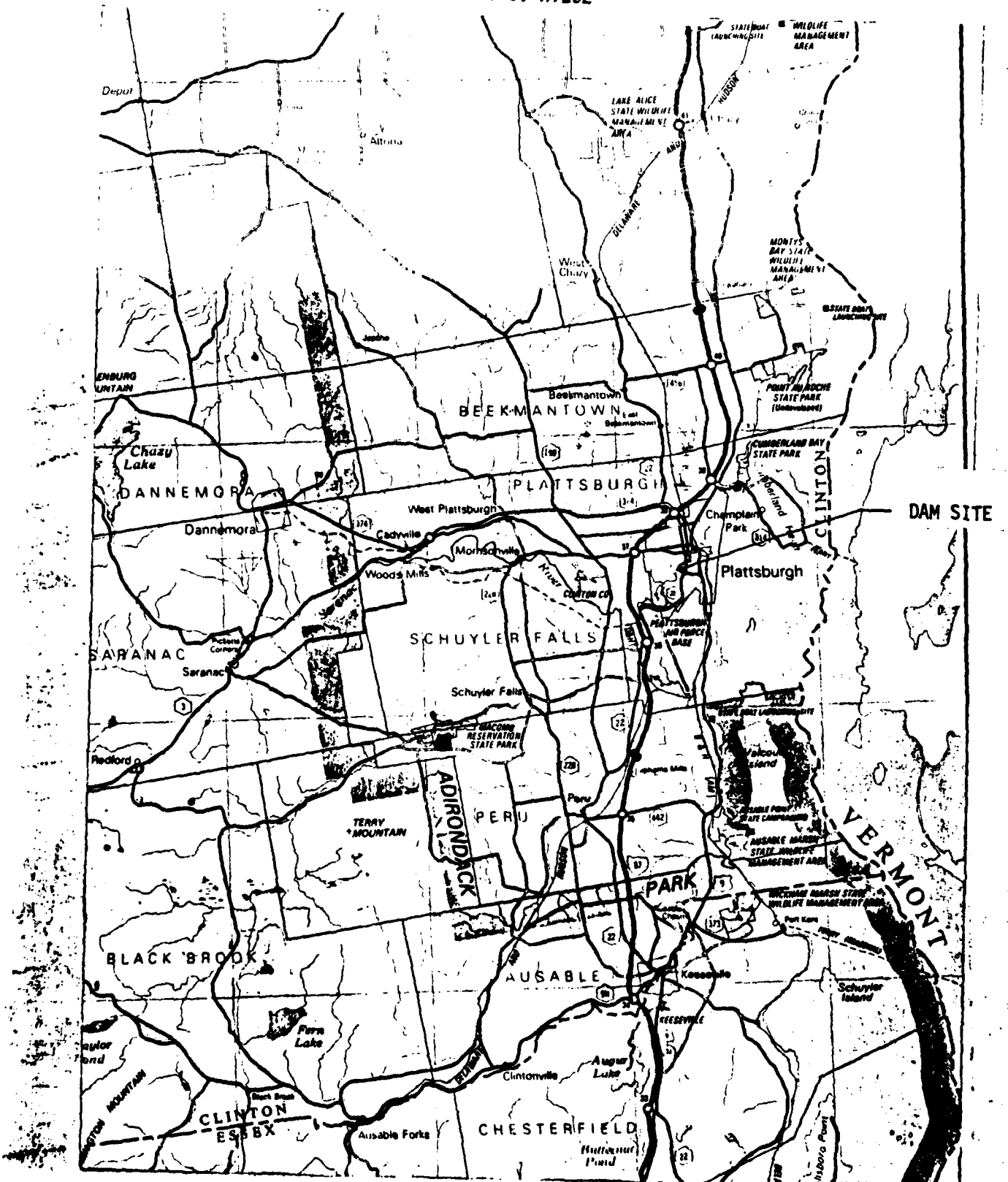
10) U.S. Department of Interior; BUREC: Design of Small Dams. 2nd ediction, (rev. reprint), 1977

11) U.S. Geological Survey; Water Resources Data for New York, Water Year 1979, Volume 1; Report NY-79-1, 1980.

APPENDIX F

DRAWINGS

VICINITY MAP
MAIN MILL DAM
I.D.NO. NY262



234 - Cham 1/2

NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

DAM REPORT

October 9th, 1913
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

SIR:

I have the honor to make the following report in relation to the structure known as the ~~Progressive Pulp & Paper Co's~~ Main Mill Dam.

This dam is situated upon the Saranac River 1 3/4 miles from outlet of river into Lake Champlain at Plattsburg in the town of Plattsburg City, Clinton County, about ~~1 3/4~~ miles from the Village ~~of~~ City of Plattsburg.

The distance down stream from the dam, ~~to the~~ Lake Champlain (to nearest important stream or of a bridge) is about 1 3/4 miles. Underwood Paper Mills Inc., Plattsburg, N.Y.

The dam is now owned by ~~Progressive Pulp & Paper Co~~ (Give name in full)

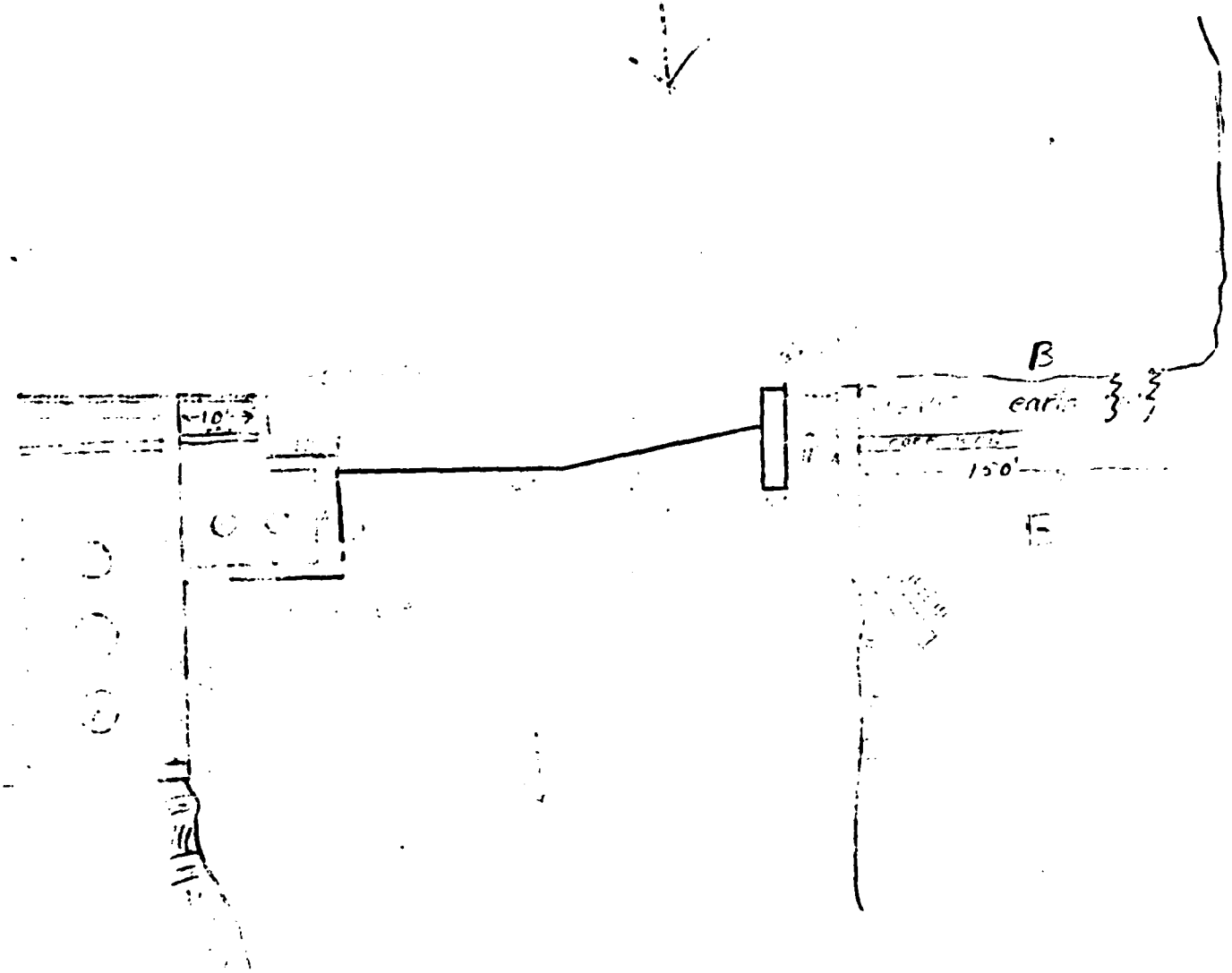
and was built in or about the year, ~~1907~~ 1909, and was ~~extensively repaired or reconstructed~~ during the year ~~1913~~. By C. Cunningham

As it now stands, the spillway portion of this dam is built of Stone (State whether of masonry, concrete or timber)

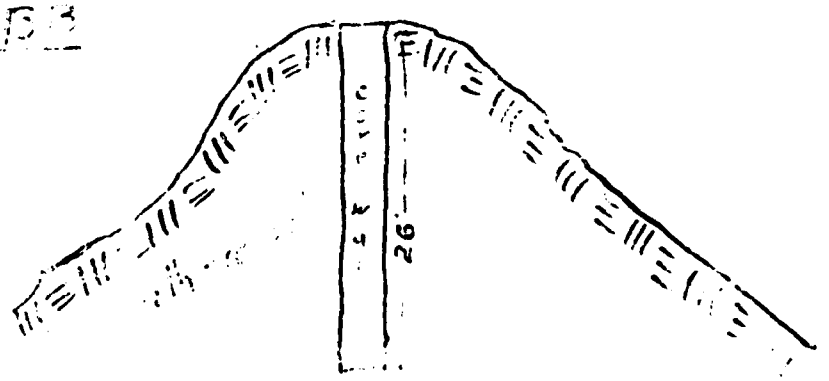
and the other portions are built of Stone & Earth on Stone portion (State of what material and whether with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is Fine Stone and under the remaining portions such foundation bed is All Earth, no Hard Pan or Gravel

Plan



B B



The total length of this dam is about 600 ft ~~feet.~~ The spillway or waste-weir portion, is about ~~185~~ 300 feet long, and the crest of the spillway is about 4 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: 3 Gates at North End of Dam about 3-10" wide and openings of gates 2-10" high

State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Tabb Masonry dam, 18' thick at Bottom 6' thick at Top, in first-class condition Aug. 4, 1920

Structure in good condition. Danger in case of break. & 4 boulder at ends.

Richmond F. Hall,
Inside Supt. Pr. Ry.

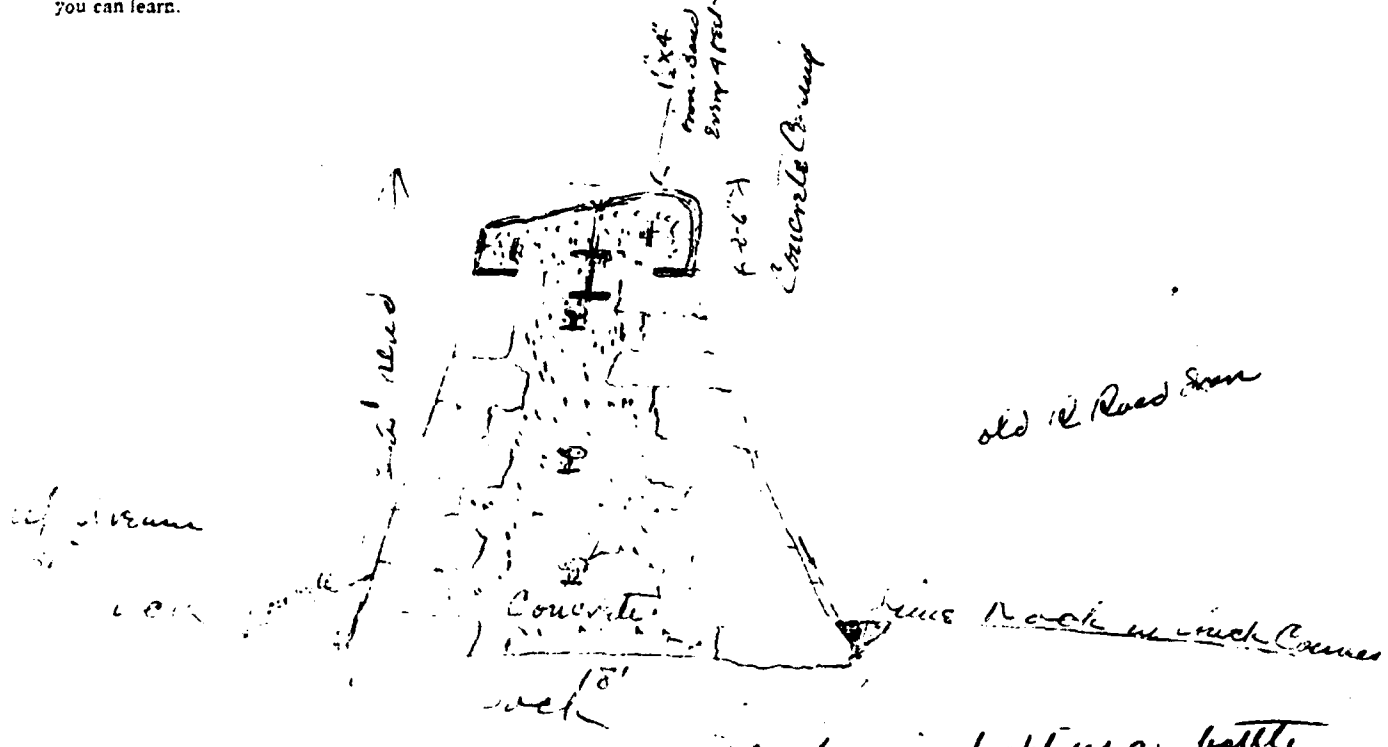
Reported by John - Cunningham
(Signature)

Fruitvale Va
(Address—Street and number, P. O. Box or R. F. D. route)

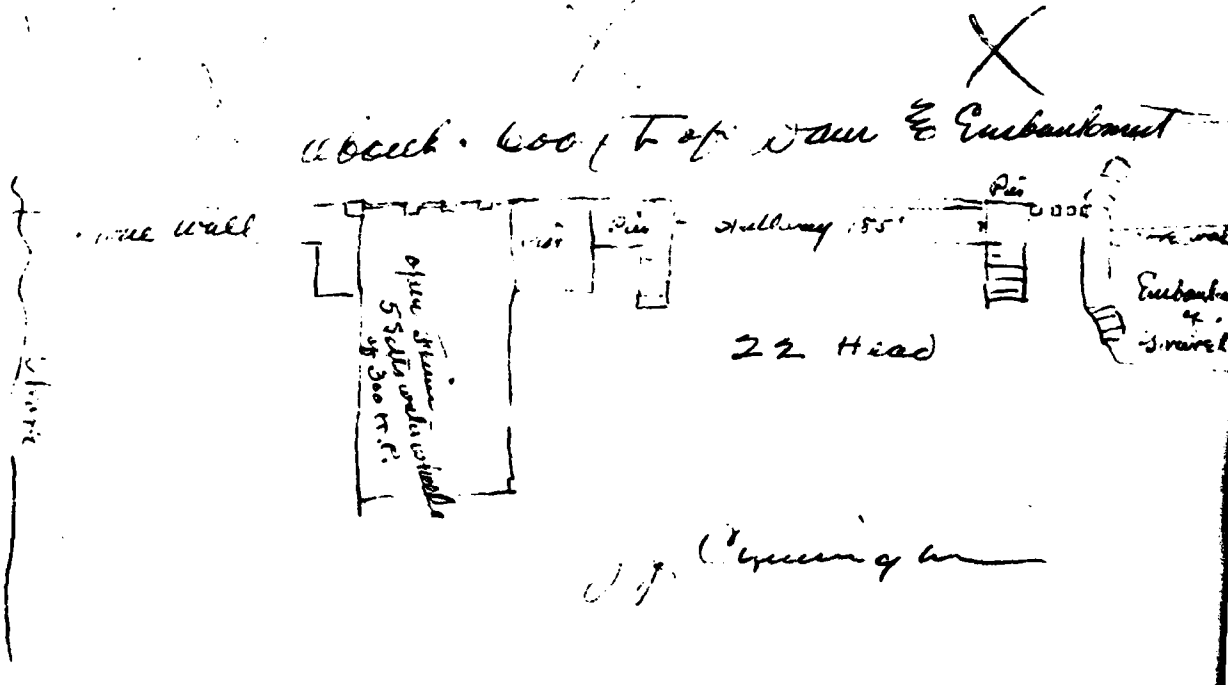
(Name of place)

(SEE OTHER SIDE)

In the space below, make one sketch shewing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.



In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other nearby objects in the vicinity.



C 236

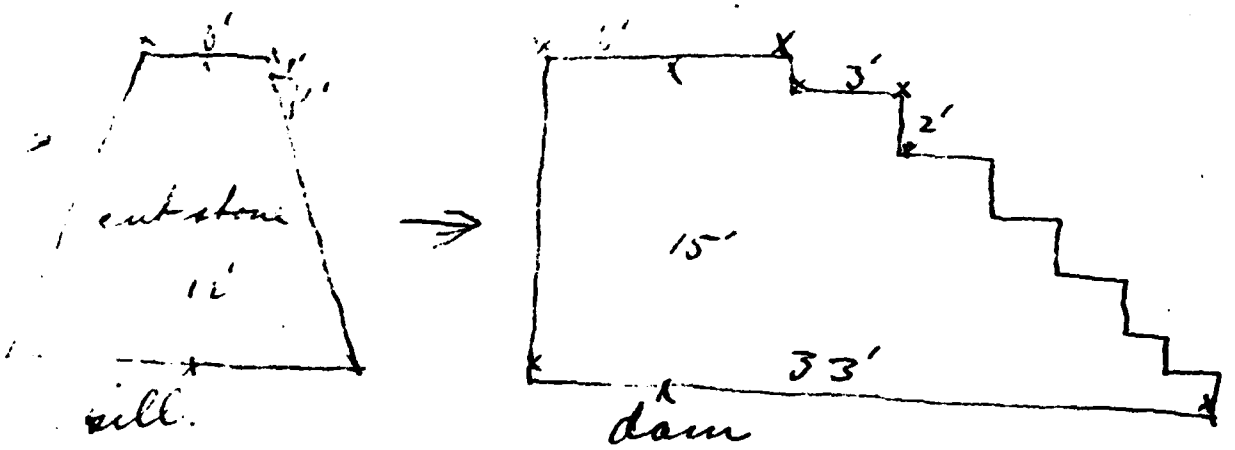
1/2

Champlain

Fill out a form as complete as possible for each dam in your district and send to State Conservation Commission, Albany, N. Y.

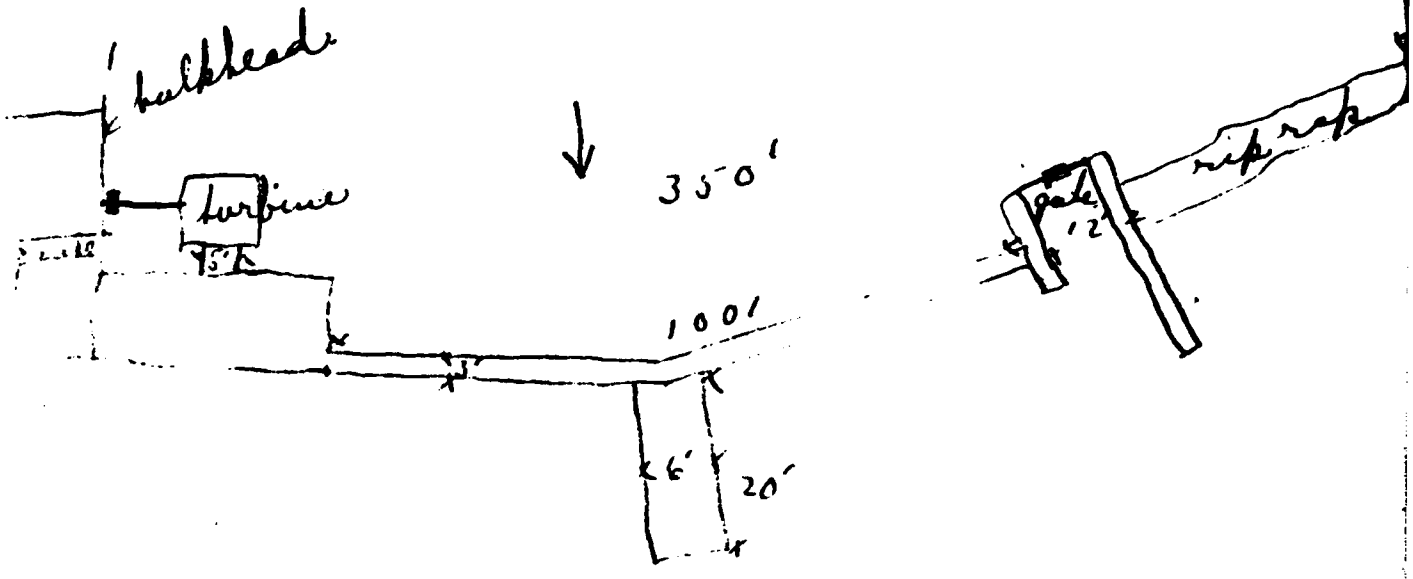
1. Name and address of owners Progressive Pulp & Paper Co Plattsburgh N.Y.
2. Date of construction
3. Use of impounded water paper mill
4. Character of foundation bed rock
5. Material of waste spill cut stone
6. Length of waste and depth below dam 100' 3' below dam
7. Total length of dam including waste 350'
8. Material of dam cut stone
9. Discharges, size and location pipe 8" in diameter 25' above

Make sketch of section of waste and section of dam, with greatest heights and top thickness of each; the cross. On opposite side sketch general plan of dam and give distance from bridge or from a tributary stream.



Plattsburg N.Y.

(Signature, address and date.) July 29 1912.


bulkhead
turbine
35'-0'
100'
6'
20'
gate
12'
rip rap